The Frank A Chilton Publication of the Frank P

What's the business outlook for 1956? See page 63

THE NATIONAL METALWORKING WEEKLY . OCTOBER 20, 1955

Letter-Matic 1960?

NEW

DEPARTURES OF TOMORROW



Today, in dictating Instruments, New Departure ball bearings contribute to compactness of design and operating efficiency. They hald moving parts in alignment—reduce wear—require no upkeep. Think of dashing through your correspondence with this imaginary scribe! It converts your voice into electronic impulses which type, micro-record, fold, insert, seal, address and stamp letters almost as fast as you can dictate!

It's just a notion now! But when some foresighted engineer works it out, you can bet New Departure will be called into design the right ball bearings to keep these intricate parts working smoothly. New Departure works with engineers right from the planning stage to develop the exact bearing for even the newest departure in design.

Whether you're planning a new product or redesigning an old one, call on New Departure. You'll benefit from a half-century of experience.

NEW DEPARTURE

DIVISION OF GENERAL MOTORS . BRISTOL, CONNECTICUT

These days WISE MEN are talking savings

IN ELECTRIC FURNACES





"The Whiting Hydro-Arc Furnace has real cost-saving advantages."



"Uni-directional electrode motors . . . no reversing."



"Arc regulation to a fixed standard."



"Electrode motors driven directly from arc-furnace bus without extra machinery."



"Regulated watt-input or heatinput to furnace. More efficient utilization of power input."



"Installation costs are lower—all these factors lead to better control and lowest cost per ton of melt."



"Only a few years ago, such electrode speed, acceleration and response were considered impossible."



"The least number of moving parts."



"Electrode consumption and refractory costs are lower."



"Let's send for the Whiting Arc Furnace Bulletin FY-168 ...it gives all the facts!"





WHITING CORPORATION

15601 Lathrop Avenue, Harvey, Illinois



Architect: Part of New York Authority; General Contractor: S. S. Silberblatt

Bolted Joints Used in Steel Frame for New Hangar at Idlewild

These trusses are part of the steel framework for the enormous new Hangar 8 at New York International Airport, Idlewild. The hangar, about 440 ft, in length was constructed by The Port of New York Authority to house airplanes of the United Airlines fleet.

The structure has a 99-ft-wide service core along its entire length. Roof trusses spanning this core are cantilevered 133 ft out on either side, forming two bays measuring 440 x 133 ft. Because of the ease of access desired, exterior structure supports were prohibited. The steel framework for the hangar was bolted, Bethlehem High-Strength Bolts being

used for all of the main connections.

Bethlehem High-Strength Bolts are ideal for joining structural members because they retain their full clamping force, thus providing permanently tight joints. They can be installed quickly, with minimum noise. And being placed cold, they do not present a fire hazard.

Bethlehem High-Strength Bolts are used with two hardened washers, one under the head, the other under the nut. A calibrated pneumatic impact wrench tightens the nut on the bolt to predetermined tension. This results in tremendous clamping pressure.

Bethlehem High-Strength Bolts

are made from carbon steel in a wide range of lengths and diameters. They are heat-treated by quenching and tempering. They meet every requirement of ASTM Specification A-325.

If you have any questions about the use of Bethlehem High-Strength Bolts, you'll find the nearest Bethlehem sales office at your service. Why not put in a call for them now? Or, if more convenient, write direct to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation Expart Distributor: Bethlehem Steel Expart Corporation







DIGEST OF THE WEEK

Vol. 176, No. 16, October 20, 1955

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Address mail to Chestnut and 56th Sts., Philadelphia 39, Pa.

NEWS DEVELOPMENTS

WHY BUSINESS LOOKS GOOD THROUGH 1956—P. 63. Most metalworking industries will have as good a year in 1956 as they had this year. Only a few of the big industries will show any drop in sales and production. These include automotive, construction and farm implements, all of which will stay close to record output. Steel has backlogs carrying into the first quarter. Good years in sight for customers assure full production through most of '56. Politics won't hurt much.

JOHN L, LEWIS STILL RUNS MINERS' UNION — P. 68 Despite his heart attack, John L. Lewis holds tight rein on the United Mine Workers. Further, his thinking and philosophy will prevail even if he passes from the picture. Good management-labor relations built up by Lewis and Moses likely to continue after Lewis steps down. Union leader opposes AFL-CIO merger.

ADULT EDUCATION FOR NEXT TO NOTHING — P. 69 More companies are discovering that they can get financial aid from their Municipal board of education for study programs for their employees. The Federal government subsidizes the courses through the Smith-Hughes Act. Benefits to the companies are many fold and the cost can be very slight.

HOW CLEVELAND GIVES MORE TO CHARITY—P. 70 Thirty-eight years ago Cleveland formed first Community Chest. Single drive surpassed all hopes and idea spread to other communities. United drive gets best business and executive brains on volunteer or "loaned executive" basis. Payroll deductions aid in employee contributions.

HELICOPTERS HAVE PROBLEMS, GAIN GROUND—P. 72 Helicopter sales last year were over \$155 million. Industry backlog runs about \$550 million. Military services are still big buyers but commercial interest is growing. New York, Los Angeles, Chicago are among cities with helicopter service. Big problems for operators are noise and expense. Bigger planes are needed for economical passenger service.

CAN UNION LEADERS CONTROL MEMBER VOTES—P. 85 Unions will mount powerful political drives in coming Presidential elections. Leaders are out to elect a friendly Congress and they have the resources for a strong drive. But Washington experts doubt that union officials can deliver a solid labor vote.

ENGINEERING & PRODUCTION

HEAT TREAT CONTROLS UP SHOP QUALITY — P. 103 If you're looking for a better, more efficient way to control your heat treat operations, you'll be interested in the system used by Bosworth Steel Treating Co. A broad range of work is handled but "the system" acts to keep production, quality at high levels.

NEW TOOLS SPARK 3-WAY COST-CUT DRIVE — P. 107 Better machining practice is one approved road to unit cost reduction. But how about better parts handling methods? And why not see what some modern metallurgy can do to improve part quality even with less expensive materials? Here's how Chrysler Corp. used this three-part formula to get better passenger car axles at greatly reduced cost.

ULTRASONIC WELD TESTER IS FAST, ACCURATE—P. 110 A definite contribution to the growing interest in field welding of structural steel is the ease and accuracy with which such construction can be tested. Ultrasonic testing has just been used for the first time in Canada to field test welds in a 15-story building. A portable unit spots porosity, slag inclusions and cracks, gives immediate results, subconsciously induces greater care in welding.

ARC CUTTING SIMPLIFIES FABRICATION — P. 112
On non-ferrous materials, are cutting by a new process
not only produces edges of saw-like quality, but does
it at exceptionally high speeds. For example, 1-in.
thick aluminum can be cut at 50 ipm; ¼-in. material
at 300 ipm. Straight lines, bevels, circles or odd shapes
can be cut with equal ease.

NEW SUPER ALLOY SPEEDS JET PROGRESS — P. 116
Jetalloy 1570—designed for aircraft gas turbine
buckets and strictly a "laboratory baby" at the outset
—is now a highly useful alloy. Good forgeability and
superior fatigue strength at 1500 F are among its
more outstanding characteristics.

MARKETS & PRICES

BOOM CATCHES UP WITH WAREHOUSES AT LAST—P. 66
Last to feel the good market, warehouses are now
being hit at both ends of the supply line. Inventories
are down; demand is up. Slow mill deliveries are putting heavy pressure on warehouses and situation shows
no sign of easing. A strong second half will make this
year a good one and 1956 looks like a busy period.

INDEPENDENTS FIGHT TO HOLD MARKET — P. 80 American Motors pins its hopes on bread-and-butter Rambler line. Completely re-styled, it's expected to increase the market for AMC. Independents' combined portion of the market dwindles in spite of efforts. Packard also introduces 1956 line with engineering innovations, industry's top horse power.

WEST ELECTRONICS INDUSTRY IS BOOMING — P. 89 Industry hopes to gross \$1 billion by 1960 for computers alone. Since 1947, one electronics maker a week has sprouted on West Coast, now accepted as center of industry. Aircraft, missiles and ordnance equipment makers are all big computer buyers. Freight is small compared with unit cost.

SCREW MACHINE PRODUCTS INDUSTRY PERKS — P. 91 A machine builder rejects the idea that screw machine products industry is losing out to competition. He points to a growing demand by the industry for equipment. He sees evidence of industry health in trend toward bigger and more efficient machines.

GREATEST STEEL PRESSURE STILL TO COME — P. 159
Despite some talk of a letdown late this year and early
next, steel procurement will continue to be a tough
problem for consumers. There's no sign of a letup in
demand. Automotive and other industries will be pressing for deliveries, and production plans for '56 indicate
that consumption will be on the high side. In addition,
depleted inventories must be rebuilt.

NEXT WEEK:

MELT SUPERALLOYS FOR BIGGER, STRONGER FORGINGS

A new development in melting superalloys marks another advance in the fast-growing field of vacuum metallurgy. These highly important materials are now being arc melted under vacuum, using consumable electrodes. Impressive results claimed include cleaner, larger ingots to 2000 lb now, 4000 lb in near future.

CLOSEUP OF HOW A SMALL COMPANY OPERATES

A relatively small company has problems quite similar to those of bigger firms. How one such outfit does business is told next week through the eyes of visiting school teachers. The teachers are taken through the plant, sit in on a sales meeting, and ask questions of company executives to get an interesting low-down.



Calumet Division, Calumet and Hecla, Inc., Calumet, Michigan

"Cities Service Heat Prover Played A Major Role In Our Expansion Program"

Miners and refiners of copper, the Calumet, Michigan Division of Calumet and Hecla, Inc., relies on two power plants to operate its many mines, reclamation plants, mills, manufacturing facilities and mine rehabilitation projects.

The two plants, located at Lake Linden and Hubbell, were recently brought up to date. The Lake Linden plant now has modern steam generating equipment fired with pulverized coal. The Ahmeek plant was equipped with new coal distributors for its underfeed stokers and new plastic monolithic furnace settings.

This modernization program, along with a planned preventive maintenance program which is now being put into effect, is expected to raise the KW capacity of these plants from 20 megawatts to 30 within the next few months.

The Cities Service Heat Prover has played a major role in this improvement program. It is used extensively to examine combustion conditions in the furnaces, check station instruments, and guard against air infiltration through boiler settings and duct work, thus enabling plant personnel to operate the equipment constantly at design efficiencies or better.

Says Power Superintendent, Robert Hein: "The portable Cities Service Heat Prover has proved invaluable in our operation. We are now using 150,000 tons of coal per year and operating at boiler efficiencies around 86%. By giving us a quick, accurate check on our firing conditions, the Heat Prover has been directly responsible for much of this record."

The Heat Prover is supplied and maintained free by Cities Service. For further information write Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y.



Calumet Reclamation Operation reclaims stemp sands processed years ago and dumped into lake. Further processing will extract copper. for power, dredge relies on the Calumet Division's Lake Linden Power Plant.



Taking Readings With Heat Prover has helped Calumet Division achieve 86% boiler efficiency. Will aid further in raising KW capacity from 20 to 30 megawatts. The unique instrument enables maximum heat benefits from coal.

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There is a Macwhyte Rope in the proper size and construction to meet every equipment need and every service condition. WHYTE STRAND Wire Rope is designed with the end use in mind . . . to provide the features that will give outstanding and economical service on your equipment.

MONARCH WHYTE STRAND is supplied in a thousand and one types, sizes, and grades. It is made Internally Lubricated, PREformed or non-PREformed, Lang Lay or Regular Lay, with Fiber Core or Independent Wire Rope core. Wire combinations in one single rope vary from 42 wires in 6 x 7 construction to 343 wires in 6 x 49 IWRC. **WHYTE STRAND** is made in all Wire Rope Classifications . . . so there is a right rope for every equipment need.

Write for MONARCH WHYTE STRAND Bulletin 5425

For proper wire rope size and construction for your equipment, request a Macwhyte recommendation.

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leading television manufacturers select



to improve product construction and design

Sharon's family of high quality steels is finding "excellent reception" in the television industry.

For example, set designers concentrating on appearance and durability, are finding Sharonart* the ideal material. These rolled-in design patterns permit restyling without retooling.

To discourage rust and corrosion in the set itself, manufacturers like Galvanite* for this tightly-bonded, hot dip, zinc coated steel meets specification all the way.

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Sharon, Pennsylvania

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SHARON STEEL CORPORATION

Sharon, Pennsylvania

Company.

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indexed in the industrial Arts index and the Engineering Index.



Editorial:

Is Business Headed For Trouble?

• IT ALL DEPENDS on where you sit; who you are; and how your glands are working. If you think we are headed for a deep business dip soon you have a 50 pct chance of being right; but you have a 50 pct chance of being right if you say we aren't.

If you lost a wad of money in the stock market your outlook will be soured. This could adversely influence your business judgment. But if you remember the times you should have been optimistic when you weren't you may remain a stable spender and planner.

If you were severely affected in the Great Depression your tinges of hysteria may come from total recall of past events; not from a sound look at today's business conditions. The two periods are not identical.

If the responsibility for millions of dollars of stockholders' money and earnings depends upon you, you will need a tough and objective mind as you read the headlines—and listen to the scuttlebutt. If upon your judgment rests the livelihood of thousands of workers then you need a strong soul-and strong prayer.

If you are serene and know that a serious business reversal can't hurt you personally then you need restraint and compassion to keep from contributing unnecessarily to such a downturn.

Economic factors will operate along certain lines despite what we think or don't think. Confidence is a big factor. But the long term view is the important cog in our industrial wheel-more so than the short term look.

If next year or in 1957 we should have a dip in the economy similar to 1954's experience it would be a temporary adjustment-not a catastrophe or the end of the industrial world. Nothing is going to stop the long-term growth in our technology, standard of living and national income.

Pension funds, expansion needs, rapid population increases, automation to support higher wages and bigger construction projects do not spell doom. A \$34 billion defense budget-insurance against creeping Communism-is not a high price to pay for freedom.

Look back 30 years. Could you have predicted then today's economic picture?

Is business headed for trouble? It depends on the combined actions of all of us.

Tom Campbell

EDITOR-IN-CHIEF

Justly Named — the Motch & Merryweather MILL-M-MATIC BED TYPE Production MILL



AUTOMATIC TABLE CYCLES

RIGID OVER-ARM

Capyrighted 1955 by The Motch & Merryweather Machinery Co.

You owe it to your production program to get all the details on this new heavy duty series of bed-type Mill-M-Matics. They utilize 25 horsepower through the spindle drive. Electrically controlled movements are mechanical to insure maximum rigidity and effective production with accuracy. . . The new Mill-M-Matic is now offered in a full range of heavy duty sizes by Motch & Merryweather, foremost builder of traveling head milling machines.

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders also of Circular Sawing Equipment, Vertical Turning, Automatic and Special Machines



letters from readers

What Are You Afraid Of?

I really think your editorial, "What Are You Afraid of?" in the Oct. 6 issue is excellent.

Are the large investors really as fickle as the stock market indicated following President Eisenhower's illness, or is there a group in this country trying to start a trend in order to make a huge financial

I certainly hope our country is not dependent on one man. R. H. Larson, Vice-President, Indiana Forge and Machine Co., East Chicago, Ind.

New Pyrometer Speeds

Sir:

We would like to get additional information on a Newsfront item in the Sept. 22, 1955, issue, "New Pyrometer Speeds Determinations." Ivan Kerzner, New Jersey Metals Co., 712 Rockefeller St., Bayway, Elizabeth, N. J.

Further information about "New Pyrometer Speeds Determinations" may be obtained by contacting Market Development Div., Leeds & Northrup Co., 4900 Stenton Ave., Philadelphia.-Ed.

Stress Analysis

Sir:

Do you know that this ("Stress Analysis," Sept. 15 issue) is probably the first simple article that has been written on Stresscoat and stress analysis?

Almost invariably mention of the words "Stress Analysis" brings out the long-hair aspect of anyone. You have wonderfully described these tests as the simple straight-forward approach to the problem which is the essence of the best stress analysis work.

Your paper very well describes how stress analysis is used to solve problems on regular products, to get answers that are better and cheaper. All too often the description is in terms of using it to measure stresses, with little view on why the measurements are made or what the purpose is for the program, F. S. Catlin, Sales Promotion Manager, Magnaflux Corp., 7300 West Lawrence Ave., Chicago.

Directory of Tool Steels

Please advise the writer as to how we may obtain five copies of your 25th edition, "Directory of Tool Steels. John M. Bradley, Purchasing Dept., Crown Cork & Seal Co., Inc., Erie Ave. at H Street, Philadelphia.

Copies of this edition are still available at \$2.00 each, less in quantities.—Ed.

Corrosion Resistance

We would like to receive tear sheets of the article "Low Nickel Type 329 Offers Good Corrosion Resistance" which appeared in your September 8th issue on page 74. Andrew Van Echo, Joslyn Stainless Steels, Fort Wayne 6, Ind.

"100 Years"

It reflects the closely-coordinated. extensive planning that went into its preparation. The result is an issue of which you can be justly proud. . . J. M. Smith, Manager of Marketing Refractories Div., The Carborundum Co., Perth Amboy, N. J.

"100 Years of Metalworking" is an issue you can well be proud of and one which will be retained for years to come. . . E. F. Frey, Manager Industrial Sales, The DeVilbiss Co., Toledo, Ohio.

The issue is of value and interest and I have greatly enjoyed reading it. . . James H. Lansing, Technical and Research Director, Malleable Founders' Society, Cleveland.

Before You Give Up...



consider

Your wastebasket knows how a design job is going ...
"You're on the wrong track,"
it says when it looks like the
one above. "You need a
fresh approach."

"Maybe you should consider

A Universal ball.
A Universal ball so tiny you can hardly see it. Or a Universal ball as big as a golf ball. There's a size for every need -including the new demands for today's new uses. For these days, designers and manufacturers are continually coming up with new products and new jobs for balls in every industry in the country

From smallest to largest, Universal balls are as perfectly round as long experience, close quality control, and skillful workmanship can produce. Tolerances within 10-millionths of an inch. And we can supply just about any kind of metal you wish.

Next time your wastebasket starts working overtime, and you see where a ball might make an "impossible" job possible, call us in. Maybe we can help.



Universal



WILLOW GROVE MONTGOMERY CO., PA.

A Minster Press means LESS SCRAP





Minster Series 1 O.B.I. Presses



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What did your stropped stampings cost you this week in material, labo, machine time, production less and rehandling?

- Greater frame rigidity, with less deflection.
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- Fast action, controlled cycling with Minster's patented Air Operated Combination Friction Clutch and Brake.
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Build a sound replacement program modernize with Minster Presses

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PRESSES

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THE MINSTER MACHINE COMPANY

fatigue cracks

by William M. Coffey

Mrs. Joanne Mowatt of Burroughs Corp., Detroit, sends along this SOS note received by a type-writer repair company. It comes via the Wolfe Envelope Co., Cleveland, which originally printed it in the "Wolf Magazine of Letters" which for some time has caused us many delightful moments.

Dear Thirth:

Would you pleath thend a repairman to fix the eth on my typewriter? It hath been broken by thome careleth perthon. I would appreciate it if you would thend a man ath thoon ath pothible becauth ath you can thee ith a great deal of bother to me.

Elthie Thmith

This hits the target particularly at this time because we in the Circulation Dept. are in the midst of moving to Philadelphia and things, thall we thay, are not as well oiled ath they were. But they will be, we're thure.

The please send all circulation inquiries, particularly the subscription orders and the money to our new address which is (as you read this) The Iron Age, Chestnut & 56th Streets, Philadelphia 39, Pa.

Tom Carry, Detroit editor, reports "maintenance problems shut down a bar mill for two weeks and one of the sheet mills lost about 10 hours of production when, believe it or not, a cat crawled into the motor room and shorted out one of the motors."

The Iron Age Chestnut & 56th Streets Phila. 39, Pa. Att: The Editor Dear Sir:

The writer, who is privileged to have a daughter in his family liv-

ing in Safety Harbour, Florida, while taking an interesting walk the other day found myself on Iron Age Avenue. The thought just struck me that this might be an interesting situation.

Yours very truly,
Louis B. Cline
CLINE & BERNHEIM

Thank you, Mr. Cline, for your thoughtfulness. Ordinarily we would send you the regular \$164,-000 prize but we don't know just how much money will be left when we get to Philadelphia.

Once there were three little kittens, whose names were Un, Deux et Trois. It was necessary for them to cross a lake that was covered with ice. Half way across, the ice cracked, and Un Deux Trois Quatre Cinq. (you can see the shape we're in!)

Puzzlers

A steel warehouse man speeding his truck along the road in a vain attempt to maintain his reputation for quick service, bumped into a farmer's cart carrying a load of eggs to market. Every egg was smashed. The warehouse man still mindful of his battered reputation offered to pay for the eggs. The farmer, who actually believed the advertisements that a steel warehouse man can solve all your problems, replied, "If you counted them two at a time, or three, or four, or five, or six, or seven, or eight, or nine, or ten, or eleven, or twelve at a time, always one would remain, but had you counted them thirteen at a time, they would have come out even. How many were there?"

The warehouse man keeled over dead.



Within the Span of a Man's Hand

The power to transmit the commands of the operator to the machine.....

By means of the movable PENDANT CONTROL the start and stop of the spindle; selection of speeds, feeds and directional movements of all heads in feed or traverse are quickly and easily accomplished. Interlocks and a stopall stick provide safety for both operator and machine.

Additional features include:

SCREW FEED

for vertical and horizontal motion of all heads — to assure fine smooth finishes with greater accuracy.

POWER INDEXED MAIN TURRET (optional)

Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.



CUTMASTER
VERTICAL
TURRET LATHE
Model 75

THE BULLARD COMPANY

BRIDGEPORT 2, CONN.

AVAILABLE IN 26, 36, 46, 56, 66 AND 76 INCH SIZES

dates to remember

OCTOBER

AMERICAN GEAR MANUFACTURERS ASSN.—Semi-annual meeting, Edgewater Beach Hotel, Oct. 23-26, Chicago. Institute headquarters, No. 1 Thomas Circle, Washington 5, D. C.

RAIL STEEL BAR ASSOCIATION—74th meeting, Oct. 24-25, Sherman Hotel, Chicago. Association headquarters, 28 South Dearborn St., Chicago.

STEEL FOUNDERS' SOCIETY OF AMERICA—Annual fall meeting, Oct. 24-25, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 606 Terminal Tower, Cleveland.

EXPOSITIONS

1955

SECOND INTERNATIONAL AUTOMA-TION EXPOSITION—Nov. 14-17, Navy Pier, Chicago. Society headquarters are at 845 Ridge Ave., Pittsburgh 12, Pa.

1056

ASTE-Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

NOVEMBER

INVESTMENT CASTING INSTITUTE— Annual meeting, November 1-3, Detroit. Institute headquarters are at 27 East Monroe St., Chicago 3, III.

THE MAGNESIUM ASSOCIATION—Annual meeting, Oct. 31-Nov. 1, Hotel Biltmore, New York City. Association headquarters, 122 E. 42nd St., New York.

SOCIETY OF BUSINESS MAGAZINE EDITORS — Annual dinner, Nov. 3, Hotel Statler, Washington, D. C. Society headquarters, 1015 National Press Bidg., Washington 4. D. C.

SOCIETY FOR ADVANCEMENT OF MANAGEMENT—Unique S.A.M. measurement of management conference, Nov. 3-4, Hotel Statler, New York City. Society headquarters, 74 Fifth Ave., New York.

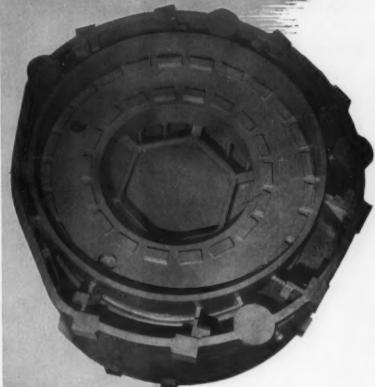
SOCIETY OF AUTOMOTIVE ENGINEERS—National fuels and lubricants meeting, Nov. 9-10, Believue-Stratford, Hotel, Philadelphia. Society headquarters, 29 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANI-CAL ENGINEERS — Annual meeting, Nov. 13-18, Hotels Congress, Conrad Hilton, Sheraton-Blackstone, Chicago. Society headquarters are at 29 W. 39th St., New York.

THE AMERICAN INSTITUTE OF CHEMICAL ENGINEERS — Annual meeting, Nov. 27-20, Statler Hotel, Detroit, Mich. Society headquarters, 25 W. 45th St., New York.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION—Annual convention, Nov. 28-Dec. 1, Boca Raton, Fia. Institute headquarters, 101 Fark Ave., New York.





a Machine Tool Weldment

Bases like this, Fabricated by Acme

excel in Strength, Rigidity, and Precision

Finish . . . save Weight and Cut Costs.

No Design is too complicated

. . . not even Yours!

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"The Facts about Weldments and Castings"

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DIVISION OF THE UNITED TOOL & DIE CO.

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STEEL STAINLESS STEEL EVERDUR ALLOYS A.S.M.E. Ud8-Ud9 Qualified Welders • A.P.I. - A.S.M.E. Approved Underwriters Label and Inspection Service • Navy Approved National Board Approved • Hartford Steam Boiler Inspection Service

第88世界第四

AUTOMATION in 91 station,
182 operation, in-line transfer machine
features four segments which can
operate independently or as a unit to
assure continuous production of automotive automatic transmission cases at
100 cases an hour at 80% efficiency

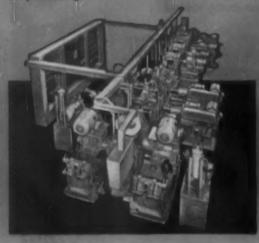
SNYDER

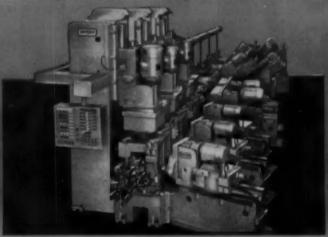
TOOL & ENGINEERING COMPANY
3400 E. LAFAYETTE, DETROIT 7, MICHIGAN

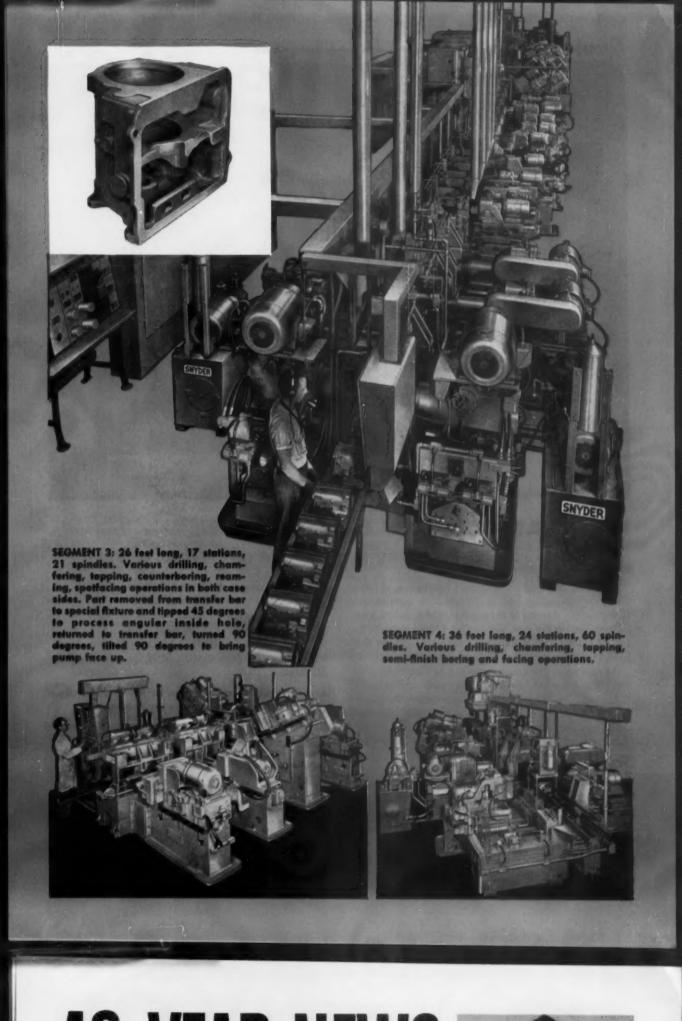
30 Years of Successful Cooperation with Leading American Industries

SEGMENT 1: 40 feet long, 19 stations, 10 spindles. Part manually loaded, both onds face milled, counterbored, three diameters rough and finish bored and faced, two pads side milled, pump ped face milled, clearance slot milled. Part titled 90 degrees in processing.

SEGMENT 2: 47 feet long, 31 stations, 91 spindles. In top face, and and at angular locations inside, 51 holes are drilled, countersunk, semi-finish and finish reamed, spatfaced, tapped. Part is tilted 90 degrees and rotated.









HOW FAR CAN YOU GO

in multiplying service life of critical parts?

Tips were breaking off these fuel injector nozzles for diesel engines within one to 30 days after installation. Result: costly damage to the engines. The nozzle manufacturer was on the spot. He needed a tougher steel . . . and one with greater hardening accuracy because the holes in the nozzle had to be held extremely small.

At this point the company called in Carpenter . . . and a Carpenter-engineered specialty steel was matched to the job. Service life of the nozzles promptly increased from 30 days to an average of two years. And shop fabricating problems literally disappeared.

Every week, more companies like yours are discovering just how far they can go in increasing service life of critical parts . . . reducing fabricating headaches . . . improving product salability. Here's one reason why: Carpenter quality and pioneering ability are backed by

one of the largest staffs of skilled metallurgists, per pound of steel produced, in the industry.

Can you honestly afford to remain "satisfied" when this road to improvement lies wide open? Start by sending for a copy of "A Guide to Specialty Steels as Made by Carpenter." The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.

Are you taking advantage of these speciallyengineered steels as made by Carpenter?

Matched Tool and Die Steels / Stainless Steels / Special Purpose Alloy Steels / Silicon and High Nickel Alloys / Valve, Heat-Resisting and Super Alloy Steels / Tubing and Pipe / Fine Wire Specialties



for product improvement



40"YEAR NEWS

PARKER RUST PROOF COMPANY

PUBLISHED BY PARKER RUST PROOF COMPANY FOR THE METALWORKING INDUSTRY



On this, our Fortieth Anniversary, our humble and grateful thanks to those we have been privileged to serve during two World Wars, the Great Depression and now our period of greatest prosperity.

Parker Rust Proof Company, R. W. Englehart, President

A LIST OF "FIRSTS" BY PARKER RUST PROOF

- First commercial phosphate rust-proofing process (1915).
- 2. First high speed production phosphate rust-proofing process.
- First process for spray application of phosphate coating materials.
- First steel mill application for phosphate coating galvanized sheets.
- First phosphate coating of ordnance items.
- First substitute for tin in tin cans.
- First phosphate coating process for wear resistance on machined elements.
- First process for cold drawing seamless and welded carbon steel tubes.
- First process for cold drawing stainless steel.
- 10. First process for cold extrusion of metal.
- First process for treatment of metal to permit elimination of ground coat in porcelain enameling of metal (1955).

BIRTHDAY TWINS: NEW PRETREATMENT FOR PORCELAIN ENAMEL; BONDERITE WITH ICRA

Two new Parker products have been announced within a few months of the company's 40th Anniversary. One is a revolutionary new approach to porcelain enameling on ferrous metals, the other is a refinement in phosphate coating to produce more durable, more attractive paint finishes.

Parker Pre-Namel 410

This new Parker product, a pretreatment used to prepare ferrous metals for porcelain enameling, eliminates the need for a ground coat, makes it unnecessary to use premium alloys, permits application of finish coat directly on the metal.

One-coat porcelain enameling over Parker Pre-Namel 410 is simpler and more economical to produce. Durability of the finish is improved, too, as shown by standard ASTM and PEI tests. Rejects and parts for re-operation are reduced to a degree never before possible. 98% acceptance has been attained in production test runs. Plant men familiar with the product estimate that economies through Parker Pre-Namel 410 will amount to from 1 to 3 cents





Left: Conventional two-coat porcelain enamel on enameling iron angle failed when twisted 70°. (Metal, twisted less than its elastic limit, returned to original shape.) Right: Finish coat only, over Parker Pre-Namel 410 on enameling iron angle, withstood 240° twist before failure.

per square foot of enameled surface:

Parker Pre-Namel has been thoroughly tested for two years. It is ready now for use in production applications on the various types of articles finished with porcelain enamel.

New Bonderite Has Built-In Crystal Refining Agent

Series 800 Bonderites contain ICRA (Internal Crystal Refining



Photomicrograph, 100X, of steel panel after phosphate treatment without ICRA. Note large crystals.



Photomicrograph, 100X, of steel panel after treatment with Bonderite with ICRA. Note fine, dense crystals.

Agent). This new built-in control produces a denser, finer, more uniform crystalline structure which results in improved paint adhesion and greater luster and reflectiveness.

This new series of Bonderites has the simplicity of operation and control, the uniformity of results and the over-all economy that characterizes all Parker products.

There's a formulation to meet almost every requirement of material to be treated, type of equipment and operating speed.

AUTOMATION IN FINISH SYSTEMS IN 1928

Automatic handling of materials through a series of operations—"automation"—is new in name only to Parker. Among the contributions of this company to the metalworking industry has been the development of straight line production, without intermediate handling, of parts through cleaning, metal preparation, dryoff and painting.

Parker's engineering department, working with conveyor and equipment companies, pioneered the first continuous dip-treatment installation in 1928, in which wheel rims were carried through cleaner, rinse and Parco Compound tanks by conveyor.

When faster-acting Bonderites were developed by Parker research, spray equipment was designed to accomodate the higher production speeds it made possible. The reduced costs and higher uniform quality, that comes with automatic operation, were made available to users of Parker Products years ahead of other automatic processing.

"GOLD STANDARD" IN



This automatic machine treats panels with Bonderite on a production basis to meet the demands of Parker customers.

The Bonderite-treated panels prepared in Parker's service laboratories are the Gold Standard used in testing paint performance. To evaluate new paints and maintain quality control on production, manufacturers will use over one half million of these Bonderitetreated panels this year. When you use Bonderite in your plant, you are using the recognized leader in the field.

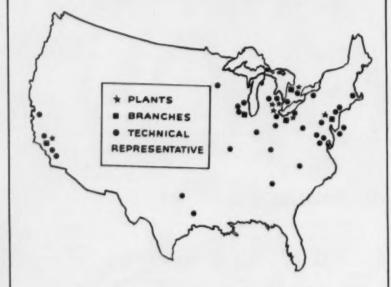
New Products, New Methods Come from Parker's Research Laboratories

There has been a research department at Parker for as long as there has been a company. In the early days it was a one- or two-man department. Now the technical staff numbers over 100. Parker research is responsible for the products and processes listed under "Parker Firsts" on the preceding

page, and for hundreds of refinements and short-cuts that have meant money, time and material savings for plants throughout metalworking.

Parker's customers profit by having this imaginative, productive, and experienced research program working for them.

PARKER PRODUCTS ARE TO YOU



Fast supply and service are important in the Parker package! The map shows coast-to-coast locations of plants, branch offices and technical representatives. No matter where you are, there's Parker service quickly available.

Parker technical representatives, backed by the most extensive know-how and experience in the industry, are themselves thoroughly experienced. The average Parker field representative has 11 years on the job!

WORLD-WIDE EXPERIENCE! Parker and its affiliates in Germany, England and France share over 125 years of experience in this specialized field.

For full information on any of the products listed below, call or write

PARKER RUST PROOF COMPANY, 2167 East Milwaukee, Detroit 11, Michigan

*Banderite corrosion resistant paint base

> *Parco Compound rust resistant

Bunderite and *Banderlube aids in cold forming of metals

*Parco Lubrite
wear resistant for friction surfaces

*Parker Pre-Name!
pretreatment for parcelain enameling

Tropical Paints
maintenance points for industry since 1883



Black & Decker electric drills mean low initial costmore convenience, less noise—and they're

TO LAST!

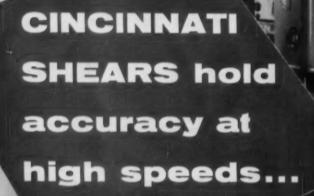
The power, speed and accuracy of Black & Decker Drills mean faster, better production, lower costs! The Black & Decker-originated pistol-grip and trigger-switch, the lightweight, balanced power GUAR-ANTEE reduced operator fatigue! And unexcelled workmanship throughout makes your Black & Decker Drills thoroughly dependable, inexpensive, "low maintenance" production workhorses.

31 models assure you of the widest selection of drills, from \(\frac{1}{4}'' \) to 1\(\frac{1}{4}'' \) . . . for intermittent or continuous heavy-duty production or maintenance jobs! Call your Black & Decker distributor or write for a free catalog to: THE BLACK & DECKER MFG. Co., Dept. 7810, Towson 4, Md.

Leading Distributors Everywhere Sell

Drilla • Sanders • Polishers • Grinders • Valve Refacers • Vibro-Centric Drivers & Kits • Shears • Vacuum Cleaners • Black & Decker's complete line of portable electric tools—all power-built to make your jobs faster, better, easier!





of THE HOELTGE BROS., INC.

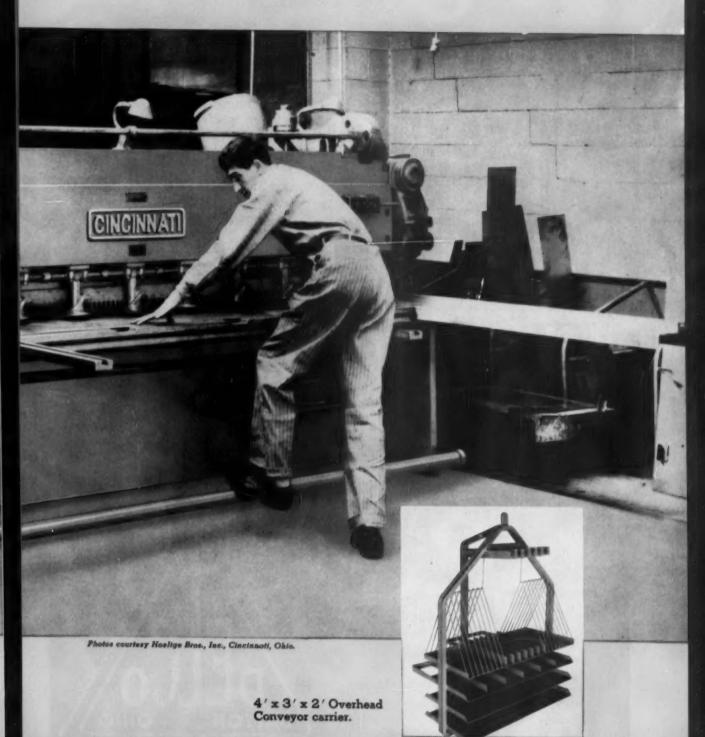
For seven years, this Cincinnati Shear has given trouble free performance on manufacturing and jobbing work, blanking 3/1e" and lighter steel sheets.

These Cincinnati features are profitable at Hoeltge Bros.:

- Hydraulic holddowns.
 - · Accurate back gauge.
- · Four-edged knives.
 - · Easy operator control.

Save time with a Cincinnati Shear. They cut materials of various thicknesses without changing knife clearance.

Investigate these money making Cincinnati Shears. Write for Catalog S-7.



THE CINCINNATI SHAPER CO.

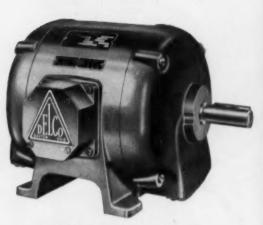
CINCINNATI 25, OHIO, U.S.A. SHAPERS . SHEARS . BRAKES

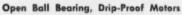


dependable power...

DELCO Electric Motors













Totally Enclosed Fan-Cooled Motors

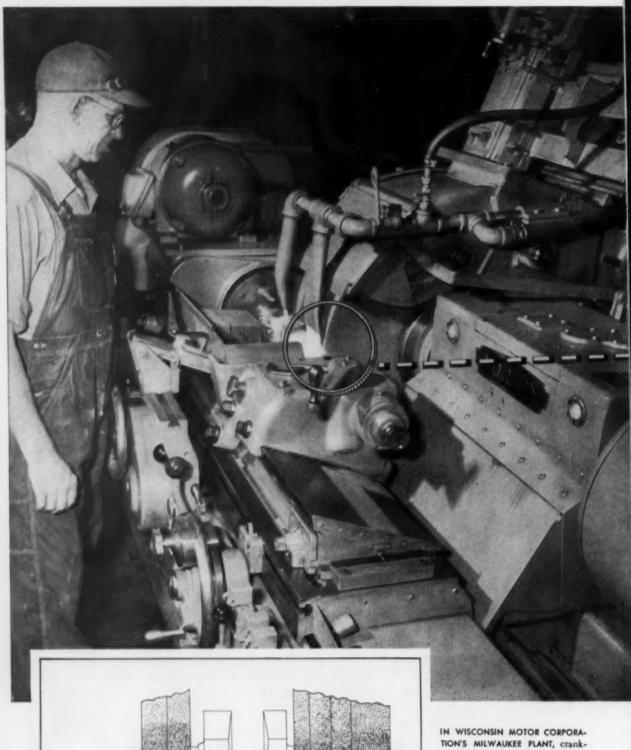
You can always depend on Delco for jobfitted electric motors. Wherever you are, whatever your power needs, just pick up your phone and call us.

Every Delco motor is backed by unsurpassed research facilities and manufactured to rigid standards of workmanship. Then it is carefully tested and inspected before shipment. But our responsibility doesn't stop there. We'll put Delco engineers right in your plant . . . at your request . . . to work with your engineers on applying the best motor to the job. Delco delivery is always prompt. Delco service is always fast and dependable. For reasons such as these, wherever electric motors are used, you'll find Delco preferred.

DELCO Electric MOTORS

DELCO PRODUCTS, DIVISION OF GENERAL MOTORS, DAYTON, OHIO

Proved best by Performance!

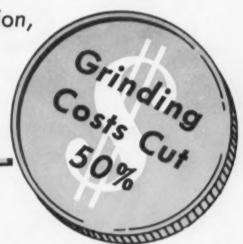


IN WISCONSIN MOTOR CORPORATION'S MILWAUKEE PLANT, crankshafts are ground on a Norton Type
CTU-HD 10" semiautomatic heavy
duty cylindrical grinder for approximately half what this job
formerly cost. Diagram shows six
simultaneous grinding operations:
two diameters by wheel on left,
three diameters and taper by wheel
on right.

THE IRON AGE

The "WISCONSIN STORY"...

Wisconsin Motor Corporation,
leading manufacturers
of heavy duty air-cooled
engines, reports:



with this Norton Heavy Duty Grinder

Type CTU-HD machine in Milwaukee plant grinds crankshafts faster and better — at one-half previous cost!

Wisconsin Motor Corporation's endorsement of the Norton Type CTU-HD cylindrical grinder is echoed throughout industry. In plenty of other modern plants this highly advanced, heavy duty machine is doing an outstanding job of boosting production rates and profit margins.

A single 10" Type CTU-HD — or 14" Type LCTU-HD, with increased swing — replaces several separate old-type grinders. It accommodates multiple wheels widely spaced, making it ideal for many plunge cut operations. Or it will take large diameter wheels, essential on such jobs as grinding crankshaft bearings, in order to permit adequate wheel

wear before interference with parts of the work.

Semiautomatic or Plain

The semiautomatic arrangement provides an adjustable, automatic grinding cycle under one-lever control. The operator merely loads and unloads, and so can handle more than one machine. Except for this feature the plain machine is identical, and both machines are arranged for fast traverse grinding.

Simplified Operation and Maintenance

All controls for feeds and speeds are set in front of machine. Wheel feed is by a precise revolving screw mechanism with click-count index, by which settings for .0001" in work diameter reduction can be made instantly, without visual check. Controls of work rotation and coolant flow are automatic. Pumps, motors, filters, relief valves, ways lubri-

cant control valves are all outside, for easy maintenance.

For Complete Details

see your Norton Representative or write us direct. And remember: only Norton offers you such long experience in both grinding machines and wheels — your assurance of the "Touch of Gold" that helps you produce more at lower cost. Norton Company, Machine Division, Worcester 6, Mass. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

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CF+1-WICKWIRE
MAKES WIRE FOR
THOUSANDS OF USES

VERTICAL TRAFFIC in buildings moves up and down safely and smoothly on elevator cables made of CF&I-Wickwire Rope Wire.

BEE'S IDEA of good housekeeping—frames for honeycomb boxes are neatly spaced with CF&I-Wickwire Tinned Finish Bee Wire.

to support everything from a honeycomb to a freight elevator ...count on wire



THE IRON AGE

An amazing number of widely varying needs for wire is encountered every day. The reason wire can be used so many different ways and for so many different purposes is because properties to suit almost any set of specifications can be built into the wire itself. Whatever your wire requirements—from rope wire of tremendous strength to easily-bent floral wire—your needs can be answered to your complete satisfaction. And CF&I-WICK-WIRE, offering over a century of experi-

ence and complete wire-drawing and forming facilities, can provide exactly the wire you need.

You'll like doing business with CF&I-WICKWIRE and the particular attention given your own specific requirements. And you'll like the prompt service you get from CF&I-Wickwire Plants conveniently located from coast to coast. For detailed information, write our nearest district sales office.



"KEEP OUT" signs for insects. Screen cloth woven from CF&I-Wickwire Weaving Wire provides lasting protection against all kinds of flying insects.



HOLD UP. Flowers don't wilt or droop when CF&I-Wickwire Florist Wire is used in making floral designs and corsages.



WIRE SKELETON for new roads gives them greater strength and longer life. Here welded wire fabric is being laid down. Fabric is made of CF&I-Wickwire Industrial Quality Basic Wire.



JOINED FOR LIFE, Special CF&I-Wickwire Welding Wire is used for gas and electric welding.

CFAI-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque - Amerillo - Billings - Baise - Butte - Denver El Paso - Ft. Worth - Housten - Lincoln (Neb.) - Okiahoma City - Phoenix - Pueblo - Solt Lake City - Wichita PACIFIC COAST DIVISION—Les Angeles - Oakland - Portland - Sam Francisco - Sentilo - Spekane WICKWIRE SPENCER STEEL DIVISION—Atlanta - Boston - Buffalo - Chicago - Detroit - New Orleans - New York - Philodolphia

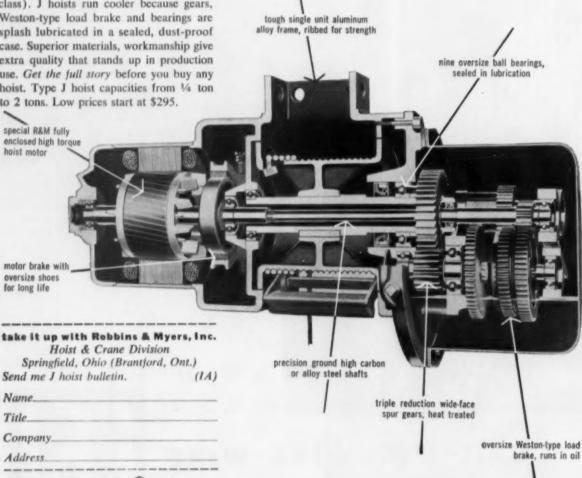


3146



J hoists give you the biggest quality lifting package at a reasonable cost, and here's why: First, there's no compromise on material-high strength carbon or allov steel shafts and gears; tough, flexible plow steel cable; oversize bearings, load brake, and shafts-all last longer under punishing loads. No compromise on workmanship, either-each of the triple reduction spur gears is wide-faced, precision cut and heat treated; the motor is R&M's own high torque hoist motor, rated for 30 minutes, 55°C. (highest rating in any hoist of this class). J hoists run cooler because gears, Weston-type load brake and bearings are splash lubricated in a sealed, dust-proof case. Superior materials, workmanship give extra quality that stands up in production use. Get the full story before you buy any hoist. Type J hoist capacities from 1/4 ton to 2 tons. Low prices start at \$295.

buy value you can see



ROBBINS & MYERS hoists . cranes . winches



If you need a helping hand.....



If you need more elbow room...

If you need more space and don't know where to get it, your Kaiser Aluminum Distributor can probably help. By drawing on his large inventory, you can use much of your present storage space for production. Or, if you're tight on cash, just eliminate your storage space and thus reduce your overhead.

think of your Kaiser



If you've bitten off more than you can chew...

If you find yourself with more work than you can handle, your Kaiser Aluminum Distributor can help. He's geared to meet your emergency needs, to go to work for you the minute you call. He stocks a wide variety of aluminum and can provide you with almost any size, shape or alloy—cut to your needs.



If you're stuck with high costs...

You can reduce your raw material outlay and cut your handling and insurance costs by drawing on the large stocks of your Kaiser Aluminum Distributor. You can use his inventory as your own...because he can give you machine-side delivery as you need it.

Aluminum Distributor

All these services mean more profits for you because they help lower your costs!

Call your Kaiser Aluminum
Distributor today! You'll find
his name on the next page!

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Standard Brass & Mfg. Co. Phone: 5-9377

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Eagle Metals Inc. of Oregon Phone: Tuxedo 5201

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Eagle Metals Company Phone: Lander 9974

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TULSA, OKLAHOMA

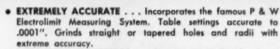
Earle M. Jorgensen Co. Phone: 85-1511

WICHITA, KANSAS

General Metals, Inc. Phone: Amhurst 7-1208-7-1209 Another NEW PRATT & WHITNEY DEVELOPMENT

VERTICAL PRECISION HOLE GRINDER

nin.



- HIGH GRINDING SPEEDS . . . Pneumatic grinding heads, of unique air bearing design, provide speeds from 4,000 to 100,000 rpm. Governor effectively maintains speed settings regardless of load changes.
- FAST, SIMPLE, ECONOMICAL OPERATION . . . Unlike conventional bare grinders, the 2E holds work stationary; grinding head has planetary motion around axis of hole. This com-

bined with fast, accurate table locating system — permits grinding holes of various sizes in a workpiece to close tolerances for size and location in a single setup. Controls for all machine motions within easy reach of operator. Time and costs are minimized.

- VERSATILE . . . Grinds holes up to 10" dia. Big table (22" x 44") with P&W open-side construction easily accommodates large or odd-shaped work. By adding a P&W Precision Rotary Table, any simple or compound angle can be located and ground without special fixtures.
- DURABLE-DEPENDABLE . . . All slide ways are protected by telescoping guards. Entire machine is designed and built to minimize wear and to retain its original high accuracy and rigidity year after year.



SEND NOW FOR COMPLETE INFORMATION Write on your Company letterhead for your free copy of P&W Circular No. 589 . . . er phone the P&W Branch Office nearest you.

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RACY



BIGGEST!

This Betts 100 Inch Worm and Rack-driven Slotter is the largest ever built in America.

It is more than 30 feet high and weighs over 140 tons.

The table has a load carrying capacity of 75 tons and the bed measures 9 feet across the ways.

Seventeen motors are required for its operation.

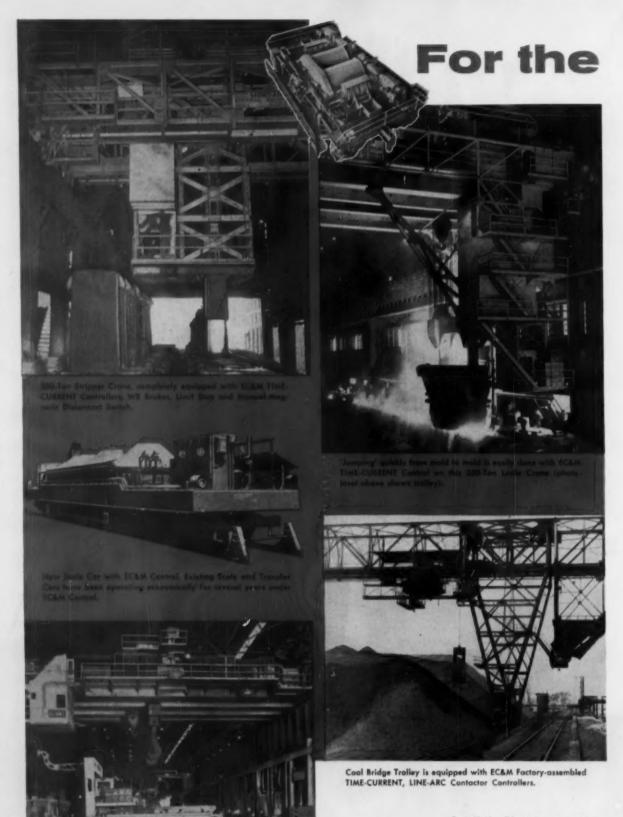


This big Betts Slotter has a reversing planer-type variable-voltage motor drive. All machine functions are push button controlled and the circular work table has General Electric ultra-precise electronic indexing.



CORPORATION, ROCHESTER, N.Y.

Birmingham Company, Incorporated.



12-Ten Charging Machine and 150-Ten Hot Metal Crane use EC&M Control for fast, accurate and dependable performance.

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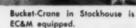
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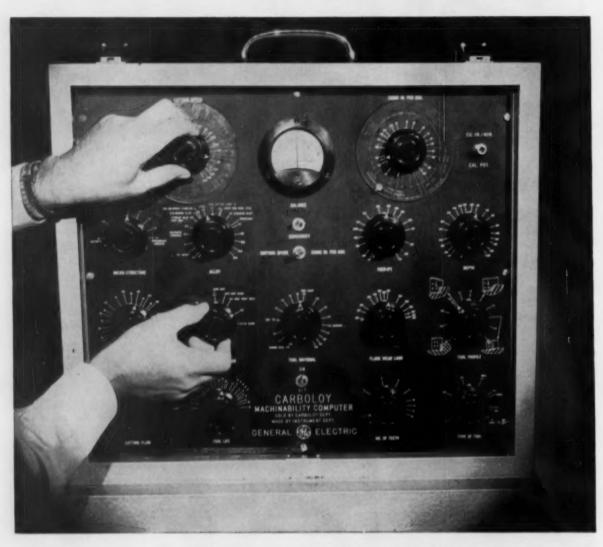
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To find an unknown variable like speed, output, or motor horsepower, simply set dials according to known information. Then turn dial of unknown variable until meter (top, center) balances at zero setting. Computer instantly shows what happens when any of the variables listed below are changed.

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Work material Microstructure Hardness Surface condition

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Tool life
Flank wear land
Tool profile
Type of tool
Number of teeth

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DEPARTMENT OF GENERAL ELECTRIC COMPANY

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Last April, Alcoa launched a broad new program to help its manufacturing customers sell their aluminum products. Spearhead of this program is the label shown above, which is given to manufacturers who make light, lasting products containing Alcoa® Aluminum Mill Products. With the backing of a promotion program that includes hundreds of millions of advertising messages in 1955 alone, this label is building sales for hundreds of aluminum products that range from air diffusers to zippers.

When you rely on your nearby Alcoa Dis-

tributor for aluminum, you benefit by 67 years of Alcoa pioneering in research and development.

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But the biggest aluminum news of the year is this: You can mark what you make with the new label that is America's new guide to aluminum value in light, lasting products for easier living. ALUMINUM COMPANY OF AMERICA, 875-K Alcoa Building, Pittsburgh 19, Pennsylvania.

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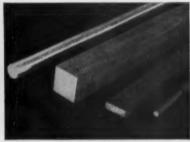
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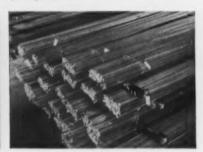
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DESIGNING WITH ALUMINUM

NO. 16

This is one of a series of information sheets which discuss the properties of aluminum and its alloys with relation to design. Extra or missing capies of the series will be supplied on request. Address: Advertising Department, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

A WELDING PROCESS IS AVAILABLE FOR EVERY PRODUCT USING ALUMINUM

Good weldability of aluminum alloys reduces the cost and improves the quality of the fabricated product.

The reliability of aluminum welds has been demonstrated by years of service in many applications. Still further developments in welding to improve the weldability of aluminum alloys have been as phenomenal in recent years as the growth of the aluminum industry itself. It is now possible to weld both heat treatable and non-heat treatable aluminum alloys. In addition, several new weldable, high strength alloys have been developed. Of equal importance are the new welding processes currently being adopted to extend the range of weldable alloys and to reduce the cost of welding. As a result of these developments, aluminum can be readily and economically welded.

Welding Processes

Spot welding of aluminum has been used for many years and continual improvements have made the process an be necessary depending on joint design. Table I shows typical welding conditions for tungsten arc welding of aluminum. TIG welding is a relatively cheap used to draw an arc to the base plate in a shield of inert gas. As in TIG welding, no flux is required. One of the important advantages is that relatively un-

TABLE I TUNGSTEN INERT GAS ARC WELDING (TIG) CONDITIONS								
Sheet Thick- ness	Current Amps' a-c	Wire Consumed Lbs/100 ft of Weld	Welding Speed in/min/pass	Argen Gas Flow (cfh)	No. of Passes	Diam Tungstee	Filler Red Diam	Gas Cup Diam (in.)
1/16"	80-170°	1/2	12	16-20	1	1/16-1/8"	3/32"	3/8-1/2"
1/8"	150-250*	2	12	20-25	1	1/8-3/16"	1/8"	1/2"
3/16"	180-320°	4	12	20-30	1 or 2	1/8-3/16"	3/16"	1/2"
1/4"	250-350°	9	10	25-35	2	3/16-1/4"	3/16-1/4"	1/2-5/8"

method which consistently produces high quality welds with good mechanical properties. With this welding process, flux contamination is eliminated as a source of corrosion. Welding can be performed in flat, vertical, and overhead positions by the TIG process, and distortion is minimized by the high heat input and welding speeds employed. For economy of operation, this process

skilled labor can be used to operate the equipment. With a minimum of training, operators can make sound welds, at high speeds. Because no flux is used, there is no problem of corrosion by flux residue. Distortion, cracking and similar welding problems are minimized by the high heat input and welding speeds. Table II shows typical MIG welding conditions. This process is used for welding alloy sheet thicker than ½ (Fig. 2), and joints in material as thick as 4" have been made successfully.

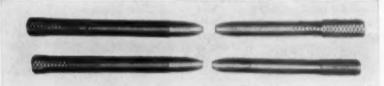


Fig. 1—Pressure welded tensile test specimen of annealed copper to 1100 aluminum %" diameter rod.
Fracture occurred in the aluminum with 100% joint efficiency,

important factor in aluminum sheet product fabrication. Pressure welding, one of the oldest methods known for joining metals, is a newcomer in aluminum fabrication. However, it holds intriguing possibilities for new applications (Fig. 1).

Gas welding and brazing, metal arc and carbon arc welding are all suitable for joining aluminum alloys, if the proper fluxes and filler metals are used. However, two newer welding processes are admirably suited for welding alu-

Inert gas tungsten arc welding (TIG). This process is an important aluminum joining method. In TIG welding an arc is drawn between the work and a nonconsumable tungsten electrode in an atmosphere of argon or helium. No fluxing is required but filler material may

is recommended for sheet material thinner than ½,", although it can be used for welding fairly thick aluminum alloy plate.

Inert gas metal arc welding (MIG). MIG welding is the most important development in recent years to extend and improve the weldability of aluminum. Here an automatically fed filler wire is

Factors Affecting Weldability of Aluminum Alloys

Weldability of aluminum alloys depends on the product, service conditions, the alloy itself and on the welding process to be used.

The aluminum surface oxide film is the most outstanding characteristic influencing the welding of aluminum alloys. Generally, this film is one of the most desirable features of this metal. However, in aluminum welding it is

PLEASE TURN TO NEXT PAGE

ABLE II	ТҮР	ICAL INERT GA	S METAL ARC W	ELDING !	(MIG) CONE	ITIONS		
Sheet Thick- ness	Current Amps 8-6	Wire Con- sumption Lbs/100' of Wold	Welding Speed in./min/pass	Argon Flow (cfh)	No. of Passes	Electrode Diam	Arc Veits	Wire Speed in./min
3/16"	170	4	24	50	1	3/64"	22	230
1/4"	200-250	8	24 24	60	1 or 2	1/16"	24-28	160 260
3/8"	240-300	16 30	24	60	2	1/16"	25-29	
1/2"	250-320	30	17	60	2	3/32"	25-30	130

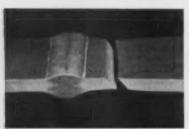


Fig. 2.—Tensile specimen of MIG weld in 5086 alloy V_4 " plate. Fracture occurred in parent metal at 40,000 psi with 15.7% elongation.

necessary to eliminate its effect. One method is to use a flux which dissolves and carries the oxide film away. In pressure and spot welding, the metal is cleaned so that the thin oxide film breaks up during welding. A third method of removing the oxide is by the action of the arc in the inert gas metal arc welding processes.

Thermal and electrical conductivity are also important in aluminum welding. Because aluminum alloys conduct heat and electricity much better than does steel, much higher currents must be used in resistance and arc welding them. Despite the low melting point of aluminum alloys, aluminum welding requires as much heat input as steel. Aluminum's high coefficient of thermal expansion accentuates internal stresses and warpage, which are also affected by the rate and amount of heat input. Consequently, high welding rates are more economical because expansion and distortion are minimized and less energy is lost.

Where structural strength requirements are high, porosity and crack sensitivity may be encountered. Welding processes and materials are now available for making welds that are consistently nonporous and crack-free. It is particularly important to use clean, dry sheet or plate, suitable filler metal, proper joint design and correct welding procedure.

Except in pressure welding, the welding operation results in fusion bonding two wrought or cast products with cast metal. It is important to recognize that weld metal is a casting and that filler metals must be selected which will

combine with the parent metal to form strong, ductile weld deposits. Table III lists recommended filler metals.

Weldable Alloys

Practically all aluminum alloys can be welded by one of the above processes. Some alloys are more suitable for welding than others. Good welds can be made in the low strength non-heat treatable alloys (1100, 3003, 5005, 5052, 5050) with little or no difficulty. Alloys 6061 and 6063 are also widely used for making strong welded structures by any of the standard processes. Where postweld heat treatment is possible, joint efficiencies approaching 100% can be obtained. Alloys such as 2024 and 7075 are used in spot welded products. Although arc welded applications of these alloys are rare, recent use of 2024 alloy in arc welded structures, with or without a post-weld heat treatment, indiin all the welding processes used for joining aluminum, except pressure welding. This heat also anneals the parent metal near the weld. A good general rule for calculating the strength of welded joints is to use the properties of the annealed base plate as design criteria. Some joints are stronger than the annealed parent metal, so that with sound welds and with the beads intact, tensile fractures occur at the fusion line or in the annealed zone adjacent to the weld bead. Table IV shows typical properties of welded joints and illustrates the advantage of using 5083 and 5086 where high strength in the as-welded condition is desired. This further shows the improvement which can be obtained in 6061 welded structures which are heat treated after welding to produce high yield strengths.

The use of sound, economical welded

TABLE IV

COMPARISON OF TYPICAL MECHANICAL PROPERTIES OF TIE OR MIG WELDS IN ALUMINUM ALLOYS 5083, 5086, 6061, 5052 AND 2024 (Transverse Specimens, Weld Beads Not Machined Off)

Alloy and Tempor	Filler Wire	Condition*	Tensile Strength psi	Yield Strength† psi	Elonga tion % in 2"
5083-H113	X5356	A.W.	42,500	22,000	12.0
5086-H112	X5356	A.W.	39,800	21,000	12.5
5052, 1/4H	4043, 5052, X5356	A.W.	28,000	14,000	15.0
6061-T6	4043	A.W.	30,000	21,000	8.5 9.0 4.0 5.0
6061-76	X5356	A.W.	32,500	21,000	9.0
2024-T3	2024	A.W.	40,000	20,000	4.0
6061-T6	4043	H.T.	44,000	40,000	5.0
2024-73	2024	H.T.	54,000	45,000	4.0
	2024 d. H.T., solution heat treat		-	'	45,000 (At 0.29

cates that this method of joining 2024 may be more widely used in the future.

The new non-heat treatable alloys (5083, 5086) are especially strong in the as-welded condition, and have excellent formability and corrosion resistance. These alloys offer an excellent combination of properties in highly stressed welded structures for which they are already being used.

Properties of Welded Joints

Heat applied in the welding operation melts the base plate and filler material joints with good strength and corrosion characteristics is one of the many reasons for the growing use of aluminum in both new and improved products.

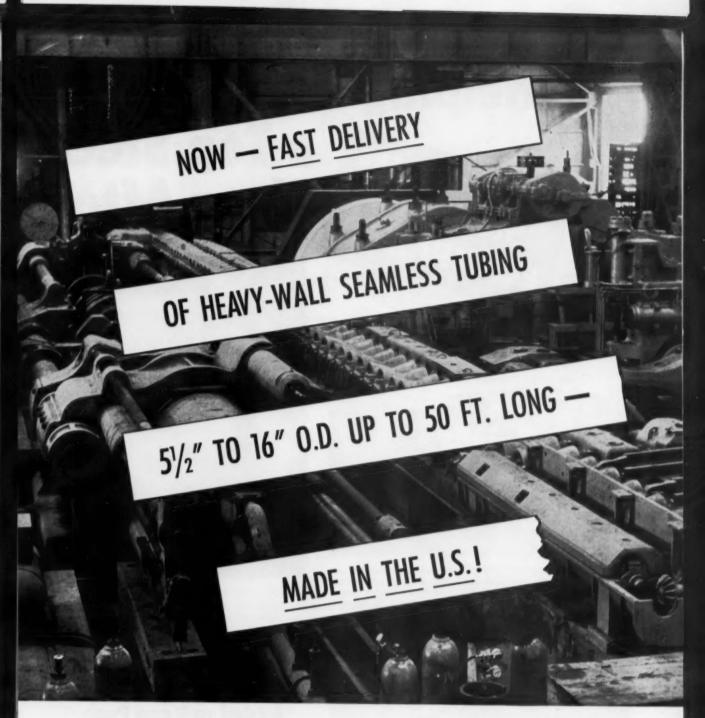
Further information concerning the welding of aluminum may be obtained from the Kaiser Aluminum sales office listed in your telephone directory or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc., General Sales Office: Palmolive Building, 919 North Michigan Ave., Chicago 11, Illinois; Executive Office: Kaiser Bldg., 1924 Broadway, Oakland 12, California.

TABLE III #ECOMMENDED FILLER ALLOYS FOR WELDINE ALUMINUM ALLOYS Base Piste Filler Alley Recommended 1100 3003 1100 3004 1003 3004 6061 6063 4043, X5356, 5154 6066 5552 5254 X5356 5086 X5356 5083 2024 2024, X5356

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They used to tell you where you could go when you asked for certain sizes and lengths in heavy-wall seamless tubing. Usually, where you had to go was Europe!

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We underline "fast delivery" in the headline because this new mill is specifically designed for fast change-over from one size and type of heavy-wall tubing to another. Now U.S. industry can count on Phoenix for "home-grown" heavy-wall seamless tubing in the special types required to handle today's higher pressures and temperatures in power and pro-

cess plants as well as oilfield deep-drilling. For more facts about this new mill — or for "The Barium Story" — write to Barium Steel Corporation, 25 Broad St., New York, N.Y. 8.4

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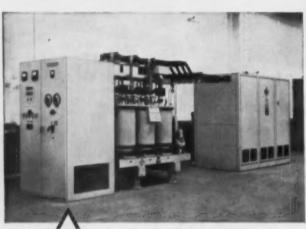
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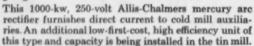
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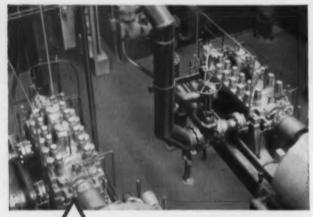


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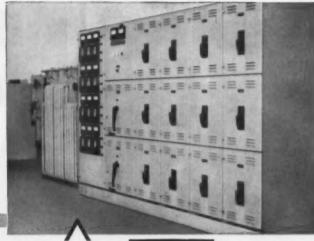


Two 6 by 4 five-stage Allis-Chalmers descaling pumps rated 1000 gpm, 1140 psi. Allis-Chalmers has also furnished fire pumps, motors and controls for other applications at the Indiana Harbor mill.

Equipment Installed in 1940 Still Going Strong as new Equipment is Added to Keep Pace with Today's Production and Quality Requirements



Obtain Production Year





Allis-Chalmers 1000-kva, 440-volt substation serves the cold mill at Youngstown's Indiana Harbor Works. Unit has non-flammable Chlorextol liquid-filled transformer. Additional substations of larger capacity are now being furnished for expansion at this plant.

These two Allis-Chalmers 6000-kw, 600-volt motor-generator sets supporting the 54-inch hot strip mill have been operating at rated capacity and above for 15 years — with minimum maintenance.

SWITCHGEAR, transformer, substation, and rectifier equipment was recently added to the growing list of Allis-Chalmers installations at The Youngstown Sheet and Tube Company's Indiana Harbor Works. These Allis-Chalmers units were specified for the new cold mill that is part of the major expansion program at the Indiana Harbor plant.

For many years, Allis-Chalmers equipment has served Youngstown well. Motor-generator sets, motors, pumps, Texrope drives, transformers, switchgear—all have been supplied over the years to help keep production at The Youngstown Sheet and Tube Company plants modern, flexible and economical.

You too can take advantage of the wide range of Allis-Chalmers products and superior service . . . backed by experience gained serving the steel industry since the days of the famed Corliss engine drives. For help in planning new facilities or modernizing present plants, contact the A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

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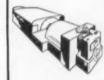
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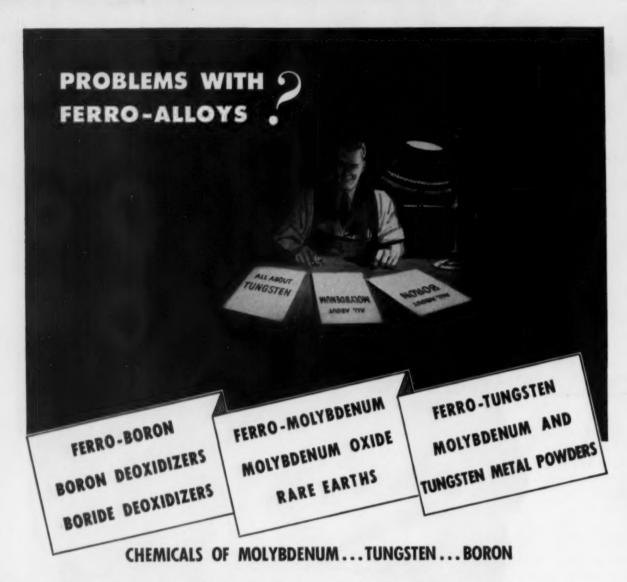


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Molybdenum is now available in unrestricted supply to improve strength and machinability. Dependable results are still one of its major attributes.

Tungsten, for hardenability and wearability improvement is now used in surprisingly small additions, with great success.

Boron, as an intensifier of the effects of other alloying materials, may be used in very minute additions, and yet maintain the essential properties of the castings desired. The most economical and satisfactory form to introduce Boron is recognized to be found in MCA's Ferro-Boron.

Operating the world's largest rare earth deposits, the Molybdenum Corporation of America has recently conducted extensive pioneering research in evaluating the properties, applications and uses of RareMeT Compound.

In nodular iron, small additions of rare earths have helped to produce consistently good ductility by counteracting subversive elements such as lead and titanium.

Write today for further information.

MOLYBDENUM

Grant Building

CORPORATION OF AMERICA

Pittsburgh 19, Pa.

Offices: Pittsburgh, Chicago, Detroit, Los Angeles, New York, San Francisco
Sales Representatives: Edgar L. Fink, Detroit; Brumley-Donaldson Co., Los Angeles, San Francisco
Substituty: Clevelland Tungsten, Inc., Cleveland
Plants: Washington, Pa., York, Pa.



Spring Steel by Superior

for the

you require in fabrication! in service! Uniform, dependable response to your manufacturing processes and subsequent service requirements is outstanding in SUPERIOR Spring Steel. We build uniform behavior into every coil, from specified analysis of composition to final anneal before shipment. We're strip steel specialists: you gain by it. Specify SUPERIOR for your spring steel needs!

Superior Steel

PENNSYLVANIA



This is Basic Source Land for the Great Chemical Age... new--fresh--virtually untouched

- · Every major basic raw chemical.
- . 60% of U.S.A. phosphate reserves.
- 214 different minerals.
- · One-third of nation's copper.
- Largest proved uranium reserves in the nation.
- Greatest concentration of non-ferrous metal mills, smelters, refineries in U.S.A.
- Largest steel mill west of the Mississippi.
- · Low-cost power, water, fuel.
- Intelligent and stable labor force.
- · Sound diversified economy.
- · Healthful climate with low humidity.
- A gateway to the rich, far west market where America is growing fastest.
- . Plus . . . plenty of "elbew room".

The catalog of raw materials occurring in "Treasure Chest" land—mostly in enormous quantities—lists practically every element in the atomic scale. Here in the vast Utah, Idaho, Colorado and Wyoming area served by Utah Power & Light Company, many well-known American firms have already begun to dig into new, fresh, almost unlimited sources of wealth. But they have barely scratched the surface. The potentialities merit the careful study of any industry seeking larger opportunity for today and the future.

Ask for copy of "A Treasure Chest in the Growing West"

Detailed information is presented in this Area Resource Brochure. Write, wire or telephone for a copy. Inquiries held in strict confidence. Address: W. A. Huckins, Manager, Business Development Department, Dept. 12, Utah Power & Light Co., Salt Lake City 10, Utah.



A Growing Company in the Growing West





Shell molds bonded with Resinox 736 produce smooth-surface castings which need no grinding to eliminate fins.

Link-Belt Company reports: Sharper detail,

smoother finish with Resinox 736

MONSANTO'S PHENOLIC RESIN HELPS DELIVER MORE GOOD CASTINGS PER TON OF METAL POURED

The superior performance of Resinox 736 has been demonstrated again in one of the nation's leading foundries.

In a three-year test at Link-Belt Company's Ewart plant in Indianapolis, Resinox 736 proved to have the right combination of properties to shell mold precision parts at fast production rates.

Molds bonded with various resins were compared for speed of investment, speed of cure, dimensional stability, tensile strength and resistance to heat shock. The experiments proved Resinox 736 did the job better than any

other resin now available. Link-Belt reports getting castings with sharper detail and smoother finish. Machining costs are greatly reduced—often eliminated altogether.

With the economy and quality of shell molding depending so much on the resin used, it will pay you to specify Resinox 736.

For a complete line of shell molding, core binding and sand conditioning resins that are research-developed and shoptested to meet your needs, write to Monsanto Chemical Company, Plastics Division, Dept. IA-10, Springfield 2, Mass.

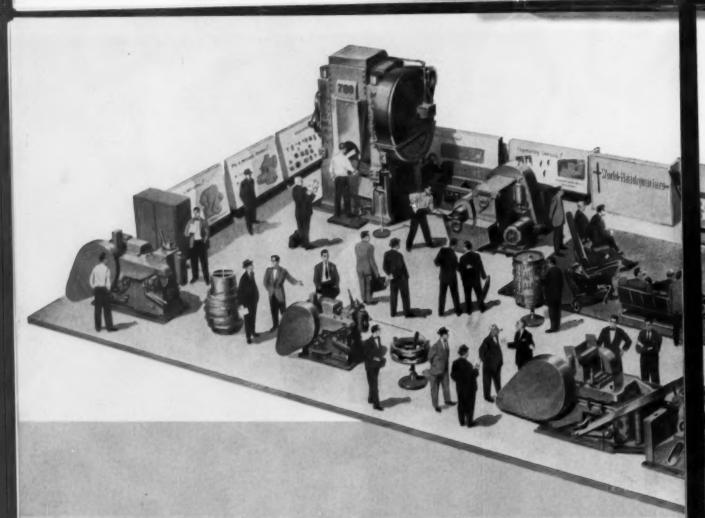
Sprockets cast by Link-Belt Co.
in Resinox-bonded shell molds require
no machining before threading.





For Stronger shell molds, specify

RESINOX °

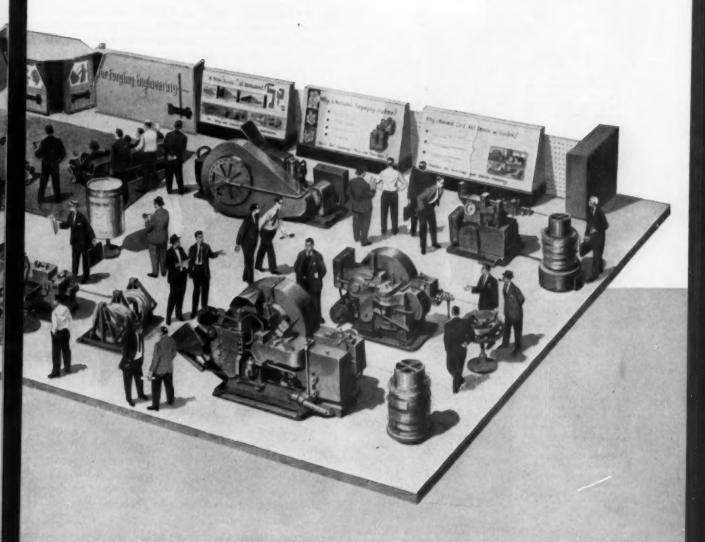


Working with You in Forging Is Our Year-Around Job!

We sincerely thank the metalworking industry for its interest in our exhibit at the Machine Tool Show in Chicago (illustration above).

More helpful to industry, however, than this exhibit of forging equipment, is National's own "show" which is going on constantly at the plant in Tiffin, Ohio. Our entire organization and our years of experience are here to help you "flow metal"—hot or cold, automatically or manually, routine or unusual.

We would like to welcome you at our "World Headquarters for Forging Engineering"—where tomorrow's better ways of producing metal parts are already being tested today.



NATIONAL MACHINERY COMPANY

TIFFIN, OHIO - SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES . MAXIPRESSES . REDUCEROLLS . COLD HEADERS . BOLTMARERS . NUT FORMERS . TAPPERS . MAILMAKERS

Hartford

Detroit

Chicago

Briefly, this ad illustrates why **DEMPSTER-DUMPSTER SYSTEM**

Container at right has cast iron bottom and inside walls are lined with fire brick. It handles hot skim off aluminum.



This Tilt Type Container was the result of a costcutting idea whereby a high temperature dusty product would be handled by a plant's Dempster-Dumpster. Container has cooling flas, counterbalanced hinged lid with 3-way locking device, 16" sliding gate valve end two sight-glass inspection apanings.



Here is a Hopper Type Container with a top door for filling and two bottom discharge doors operated by rack and pinion. Another case where Dempster-Dumpster System was applied to an additional problem to further reduce costs.



Container at right is just one of several different types we have designed to handle equipment, materlais, packages, parcels,



Above container is built with cost iron liner. The holes in outer wall

IN A NORMAL INSTALLATION the Dempster-Dumpster System is purchased by a plant because of its proved record for handling bulk materials at tremendous savings. This normal installation usually includes one truck mounted Dempster-Dumpster and any number of standard containers designed to meet the various requirements within the plant. In some cases, containers number 40 to 50. These containers can range in capacity up to 21 cu. yds., with all containers served by the one Dempster-Dumpster.

In the great majority of cases this basic installation is just a starter. Management men, constantly looking for lower operating costs, find numerous and amazing extra savings in the Dempster-Dumpster System. Once in service, transporting developments of every description come to light that supplement the original functions of the equipment. Your own men find easier, quicker and additional cost saving ideas for its use. Many even overshadow the original savings and the equipment becomes more and more indispensable.

Look over just a few of the "Special" containers illustrated in this ad. They are all the result of rough ideas that originated with the men in plants after a basic installation, then developed by our engineers. All ideas were stimulated by the powerful Dempster-Dumpster and its flexibility in picking up, hauling, setting down or dumping anything that needs transporting, at lower

One man, the driver, and a few simple hydraulic controls in the cab of a Dempster-Dumpster, will become indispensable in your plant. It is just that in hundreds of plants of every description throughout the nation. Let one of our representatives give you details of installations. Manufactured exclusively by Dempster Brothers,



Here is one of several special drop bottom type containers equipped with coupiers and ball bearing trucks for operation in train on rails.



DEMPSTER BROTHERS





Two photos above show how all containers, regardless of design, are picked up and hauled. At destination materials are dumped from drop bottom containers as shown at left . . . from Tilt and Skip Type Containers by tilting. Any load, of course, may be set down intact.



This is a special adaptation whereby waste zinc slurry is pumped into two containers, which serve as settling tanks, enabling majority of the water to be deconted before sludge is transported and dumped at waste basin.



Tank Type Containers are available with or without casters in steel, aluminum, stainless steel, etc. Capacity ranges up to 1,200 gal. They may be lined with rubber, lead, highly resistance coatings, etc.



This is a master container with three 2 cu, yd. Insert containers. Each Insert container is provided with casters, counter-balanced spring-hinged lid for loading and dumping.

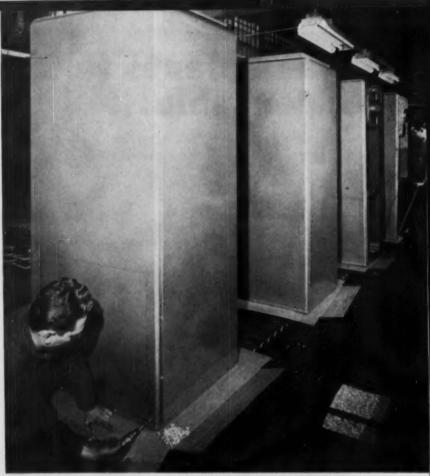
4105 North Knox, Knoxville 17, Tennessee

RESULTS SHOW IMPROVED PRODUCTION

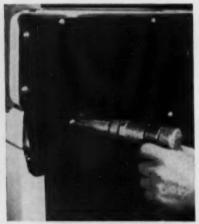
...with Phillips Cross-Recessed-Head Screws



QUICK, EASY INSTALLATION applies equally to Fleetlite — "America's FINEST Windows" — and to the Phillips cross-recessed head screws which assure sturdy, rigid, long-lasting precision construction. Says plant manager of Fleet of America, Inc., maker of these windows, "Phillips screws complement the high standards of our extruded aluminum construction. We use them exclusively."



ASSEMBLY LINE MIRACLES result from using Phillips cross-recessed-head screws in all Bryant Heater plants on heating, air conditioning and water heating units. Bryant's general assembly director says, "In all exterior or interior applications it is important that we use screws that incorporate easy assembly with rigid fastening — that means Phillips."



"NEATER APPEARING RANGE through the design of the Phillips screw head," says Assistant Superintendent of Tappan Stove Co., Mansfield, Ohio, founded 1881. "In addition, these screws improve production, speed assembly — and offer several safety factors. They have gained the approval of the men who use them."



THE FASTENERS
OF TODAY...
AND OF THE FUTURE

marks the spot
... the mark of extra quality

Allmetal Screw Products Company, Inc. • American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Company • The Eagle Lock Company • Elco Tool and Screw Corporation • Great Lakes Screw Corporation • The H. M. Harper Co. • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Co. • Parker-Kalon Div. General American Transportation Corporation • Pheoli Manufacturing Co. • Shakeproof Div. Illinois Tool Works • The Southington Holmany Sterling Bolt Company • Universal Screw Company • Wales-Beech Corp.

Set them, forget them—they stay tight New high-torque Unbrako self-locking socket set screws



Research has proved that the tighter you seat a set screw the better it works. So we designed a set screw that can be tightened tighter than ever before. We formed a deeper socket. We put a radius in the socket corner. We developed fully formed threads. We established new methods of heat treatment in atmosphere-controlled furnaces. All this,

plus the well-known self-locking knurled cup point that keeps it tight.

Let's see what the changes in the Unbrako socket mean to you. The deeper socket gives you more purchase with the wrench. Since more wrench can be put in the socket, you can tighten the screw much tighter. And you won't ream the socket or round the corners of the wrench. The radius in the Unbrako corners eliminates the sharp corners where cracks start. Ordinary socket screws have sharp corners which often crack even at torques much lower than those recommended for Unbrakos.

You can't buy a better set screw than an UNBRAKO. See your authorized industrial distributor today. Or write STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

Up to 40% higher

tightening torque—

a new Unbrako feature

RECOMMENDED SOCKET SET SCREW	
TIGHTENING TORQUES	
(Inch - Pounds)	

(Inch-Pounds)				
SCREW SIZE	UNBRAKO	SET SCREW	SET SCREW	DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

ALL UNBRAKOs can withstand higher tightening torques than ordinary socket set screws. For example, the recommended torque for a ½" UNBRAKO is 87 inch-pounds—40% greater than that recommended for an ordinary socket set screw.

Unbrako Set Screw

Ordinary Set Screw

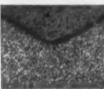




COMPARE the socket depth. The Unbrako socket at the left is much deeper than the socket in the ordinary set screw at the right. This additional depth in the Unbrako socket gives you more purchase with the wrench—you can set an Unbrako much tighter.

Unbrako Set Screw

Ordinary Set Screw





THE RADIUS put in Unbrako socket corners eliminates the sharp corners where cracks start. They distribute the stresses developed when tightening torques are applied. You can seat an Unbrako tighter without screw failure. Ordinary set screws have sharp corners which often crack when tightened even at lower recommended torques.

STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION



DIAMOND MACHINE TOOL COMPANY

Send us your catalog, "Profit From Presses" at once. No cost. No obligation.





DIAMOND MULTI-MAX PUNCH PRESS MODEL 5036 ILLUSTRATED

OPEN THROAT PRESSES...

with long bed and ram areas illustrated in a

new catalog, "Profit From Presses". Twenty pages with case history photographs such as illustrated below. Diamond Multi-Max punch presses are available in 30 and 50 tons capaci-

ty, 100 tons on special order. Six models



for your selection. 24", 36", 48", 60", 72" and 84" working surfaces of bed and ram lengths. Air clutch and air brake at no extra cost. Mail in above coupon for your copy of this catalog, or writeon your letterhead.

SALES AND SERVICE IN ALL PRINCIPAL CITIES



KWIKSET LOCKS, INC., ANAHEIM, flash trimming "Zamac" zinc alloy casting in the manufacturing of trim hardware for automobiles. Multi-cavity dies are used for flash trimming multiple parts at each stroke. The press has a 5" stroke for working clearance to remove parts.



ELECTROWELD STEEL CORP., AZUSA, piercing, forming, and crimping 1%" 18 and 16 gauge tubing for dinette chrome furniture. The permanent setup of these three dies over the long bed area of the press eliminates down time in changing dies.



DIAMOND MACHINE TOOL CO.

PICO, CALIFORNIA



"SURFINDICATOR* cuts our costs by eliminating extra machining"

The Brush SURFINDICATOR enables the operator to measure, at the machine, the exact surface finish which he is producing. Thus, it allows him to take necessary steps to make this the optimum surface finish from a cost to performance standpoint. The surface finish of these farm implement parts is checked right on the production floor at Massey-Harris-Ferguson Inc., Racine, Wisconsin.

They state: "Using the SURFINDICATOR, we can immediately see if parts are within the range of design specifications for finish. Considerable machining time and cost has been saved by eliminating reworking of finished pieces to meet specifications. The Surfindicator is an asset to our work because of its portability and simple direct measurement."

You can cut your costs, simplify your inspection with the SURFINDICATOR. Let a Brush representative demonstrate this portable, easy-to-use instrument in your plant. Send coupon today. Trade-Mark

BRUSH ELECTRONICS

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZGELECTRIC MATERIALS . ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT AND COMPONENTS



COMPANY

Division of Clevite Corporation SEE THE SUBSINDICATOR AT THE NATIONAL METAL EXPOSITION IN PHILADELPHIA. **BOOTH No. 1728.**

NEW ASA STANDARD SIMPLIFIES SPECI-FYING AND MEASURING SURFACE FINISH

One uniform standard for surface finish now replaces many individual practices. You can now specify surface roughness and character of a surface in the same terms as other plants, your suppliers and your customers.

Send for new booklet containing important excerpts on the ASA STANDARD and including information of the SURFINDICATOR . the only instrument completely meeting the New Standard.



BRUSH ELECTRONICS COMPANY,

- Dept. S-11, 3405 Perkins Avenue Cleveland 14, Ohio Please send booklet describing advantages of new ASA Standard B46.1.
- ☐ Please have your representative call and demonstrate the SURFINDICATOR.

Name. Position Company Address City

October 20, 1955

In Steel Mill Processing

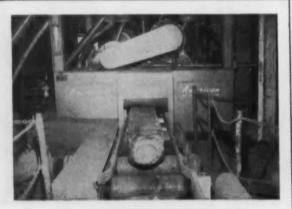
WHEELABRATOR CLEANING SAVES MONEY EVERY TIME



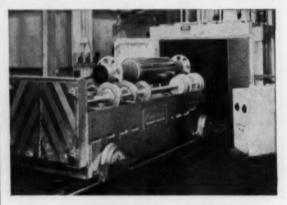
Descaling Strip at Allegheny Ludlum Steel Corp.



Descaling Sheet at Rheem Manufacturing Co.



Descaling Slabs, Billets at Atlas Steel, Ltd.



Etching Mill Rolls at U.S. Steel's Fairless Works

Mechanical descaling with the airless Wheelabrator as an integral unit in steel cleaning lines offers impressive savings in lower production costs for steel producers and fabricators alike.

In descaling steel sheet or strip or etching mill rolls, Wheelabrator's controlled abrasive blast cuts costs in many ways: reduces or eliminates acid pickling; slashes labor costs, crane service and space requirements; improves product quality; adds to equipment life.

More than 60 Wheelabrator installations now descale slabs and billets, continuous carbon strip, sheet steel, bar stock, wire rod and structural steel shapes. They also condition ingot molds and etch mill rolls.

These achievements demonstrate Wheelabrator's leadership and ten years' experience in this field. Write today for complete information on a Wheelabrator machine for your descaling requirements. Ask, too, for a test demonstration on your own products in our fully equipped laboratory or ask for the name of a plant where you can see the Wheelabrator in operation.

Write today for this factpacked Bulletin, No. 864.

WHEELABRATOR

(Formerly American Whoolabrator & Equipment Corp.)

510 S. Byrkit St., Mishawaka, Indiana





Trail Blazer of Industrial Progress

How

Morgan "points the way"

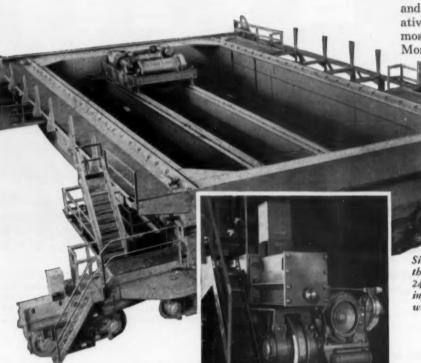
to smoother

crane operation

• INDIVIDUAL MOTOR DRIVES were pioneered by The Morgan Engineering Company to improve crane bridge travel... to provide smoother operation, to reduce the number of moving parts, to simplify maintenance, to eliminate dead weight of drive shafts, to streamline the crane.

These individual motor drives are another vital link in the chain of features that make Morgan cranes the best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



Six individual motor drives power the bridge of this 350-ton, 4-girder, 24-wheel Morgan ladle crane. Squaring shafts are eliminated; walkway width is minimized.

SI II II II

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

MORGAN

ENGINEERING CO. Alliance, Ohio

PLANT **M**merican METALINE FALLS SINC CARRONATE CADE ANIUM & SULPHUM EAST ST. LOUIS HLISBORG HILLSBORD inc and its products PLANT from COLUMBUS, OHIO JEFFERSON COUNTY to 3 QUARRIES PLANT MASCOT PICHER IMAS, TEXAS TENNESSEE E. TENNESSEE



OPERATIONS AT MONSANTO, ILLINOIS Modern and recently expanded electrolytic plant producing special high grade slab zinc, which is sold primarily to the die casting and brass manufacturing industries. In conjunction is a specialty plant for the production of zinc ball anodes, heavy plating anodes and anodes for cathodic protection. For complete picture of American Zinc operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

inc sales
ompany

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AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

~

z

FORECAST

The Iron Age Newsfront

Cold Form Nonsymmetrical Parts

Unique tooling ideas have made possible the cold forming of both symmetrical and nonsymmetrical metal parts in one relatively small midwest plant. A single stroke of the press does the entire job. In one case, the selling price of the cold formed part is equal to the grinding cost of the part made by former methods.

Setup Rule For Order Entries

Steel customers' battle to get on rolling mill schedules has made it necessary for steelmen to severely tighten up security operations. One midwest sheet mill has laid down a firm rule that any changes in entries on rolling mill schedules must be authorized in writing by several company officials at a top executive level.

What Copper Thickness For Carburizing

Heat treaters may be surprised to learn that anything less than 0.002 in. of copper plate is claimed to be inadequate for protective stop-off during carburizing. Even fussy aircraft quality requirements have never called for more than 0.001 in. Plating thicknesses in excess of 0.002 in., according to the same report, are prone to cracking and peeling.

Build Up Industrial TV Sales Effort

Watch industrial TV. Producers of industrial television equipment are building up sales forces, distributor outlets and introducing new models. The objective—sales breakthrough in 1956 that will boost installation of TV cameras from the current 15 per month to at least double that figure.

Will American Build Its Own V-8's?

Rumors persist in the auto industry that American Motors will be producing some of its own V-8 engines by the spring of next year. The corporation has been inconvenienced in the past by the necessity of buying all its V-8 engines from Packard.

Tractor Output To Dip In '56

Farm tractor production next year is expected to decline moderately from the 302,000 wheel-type units forecast for 1955. Current estimates by major farm equipment producers cite a drop off of about 5 pct in total sales for 1956 compared with this year. The anticipated dip is a result of better balance in dealer inventories.

Boost Arc Furnace Output

The standard arc furnace is no novelty, but learning how to more effectively tinker with its electrical controls has become a brand new cost-saving item. One estimate claims that by making use of top charging, optimum current control, increased secondary voltage, and a few minor improvements, actual furnace output was boosted by 70 pct.

Produce 80 to 100 Clips Per Min.

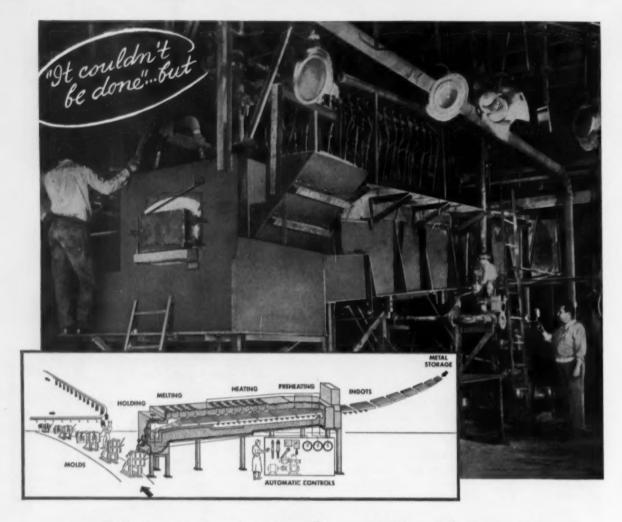
A major car producer is making five different clips on a single machine at speeds ranging from 80 to 100 clips per min. Die life has been excellent and the production rate compared with former equipment is about double. Strip runs through the machine on edge rather than in the flat position.

Washer, Dryer Sales Up 20 Pct

Trend to keep the housewife's hands out of laundry water is creating one of metalworking's largest markets. More than 8 million automatic washers, dryers and waterheaters will be sold this year, nearly 20 pct more than highest original estimates.

Redesign Pays Off

Cost savings as well as better quality are causing manufacturers to think more in terms of redesigning products to meet competitive conditions. One prominent firm recently came up with a compact new product which not only does a better job but reduces the weight of the product from 58 to 38 lb.



Cold Ingot To Molten Aluminum In 24 Minutes; Melting Costs Cut 33%

Selas Gradiation Heating is overcoming inefficiencies characteristic of batch melting . . . in this first, in-line automatic unit for continuous melting of aluminum . . . in the permanent mold foundry at Monarch Aluminum Mfg. Company, Cleveland.

35-60 pound ingots are automatically conveyed into one end . . . melt and flow into a holding pot-or into the mold itself-at the other. New economies, more production and improved working conditions are achieved from such operating benefits as these:

- Molten metal reserve reduced by more than 90%.
- · Shorter cycles: liquefies ingots in 24 minutes; preheating takes only three hours instead of 22.
- · Furnace retains efficiency at partial capacity.

- One-third reduction in fuel consumption . . . to 1.1 cu. ft. of gas per pound of melt.
- · Smaller furnace . . . gives more work area in casting
- Comfortable melting-room temperature all year around.
- · Closer quality control. Reproducibly-uniform castings.

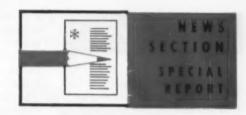
The Gradiation heating method noted above is also being successfully applied to the continuous melting of other non-ferrous metals.

Write for complete information on the Monarch continuous melting operation.



SELAS CORPORATION OF AMERICA PHILADELPHIA 34. PENNA

PHILADELPHIA 34, PENNA.



1956: Why Business Has Confidence

Few major industries will ease next year . . . Most will stay at present high level or improve . . . Machine tools may reach peacetime high sales . . . Steel sets sights on near record year . . . Many backlogs.

◆ BUSINESS can make plans for another good year in 1956, placing its confidence in continuing strong demand for consumer goods, heavy capital expenditures for plants and equipment, and natural growth of new industries reaching maturity.

No drastic letup lies ahead in any of the major industries that carried this year's recovery beyond most optimistic predictions.

Some industries can expect to write new sales and production records. Even those that will level off will do so on plateaus nearly as high as former economic peaks.

Intensive Survey

These conclusions are the result of extensive interviews conducted by IRON AGE editors with representative business leaders, evaluation of their plans and predictions, and studies of available economic statistics.

At the top of the list of determining factors is the continued high rate of income resulting from full employment, higher rates of pay and an expanding total employment.

It further appears that tax cuts during the next year are inevitable, contributing to an additional increase in disposable income.

Capacity production enjoyed in most fields of manufacturing will be followed by increasing outlays for new plants and capital improvements, all aimed at satisfying consumer demand.

Another subtle change, a shift in consumer buying habits, will contribute to the extended high rate of business activity. Over the past year, a tendency for consumers to spend more of their income on goods and services has developed. Every indication points to a continuation of this trend.

Political Picture

An important factor is that 1956, as a presidential election year, will be subjected to campaign ramifications. The recent illness of President Eisenhower and the probability that he will be unable to run for re-election underscores it.

But this in itself should have no direct effect on 1956 business. If any, it should be beneficial. Republicans will make every effort to assure the continuation of good business through the year. This should result in some mod-



SPECIAL REPORT

erate tax relief. Democrats too, are showing more confidence in business and industry. Candidates likely to contest for the nomination have come to realize that business must stay healthy to assure general welfare.

Election politics should actually work for the immediate benefit of business in 1956. The results should not materially affect the basic economy regardless of the outcome.

In only a few important segments of business activity is a leveling off at less than 1955 levels anticipated. These are construction, automotive, and farm equipment. But despite the leveling off tendency, these industries will operate on a level that is an evidence of strength and a sustained strong market.

On the government side, defense spending will continue with little change. Road building and construction of public facilities and buildings will continue or increase. State and local governments will bolster the federal government in public spending.

The Outlook

Following is an industry-by-industry evaluation of the 1956 business outlook:

Steel . . . The steel industry will have three things going for

it in '56: (1) substantial backlogs of unfilled orders, (2) high-level production by major consuming industries, and (3) rebuilding of inventories depleted by heavy consumption and slow deliveries.

It's generally agreed that major producers will operate at near-capacity levels for first six months of '56 on the basis of business already booked and the business outlook for steel's customers as detailed in the special IRON AGE survey.

Barring an unlooked-for letdown of the economy, the steel industry next year has a good chance of equaling or exceeding this year's record production, which is expected to be in the neighborhood of 115 million tons. This compares with the previous record, set in 1953, of 111.6 million tons.

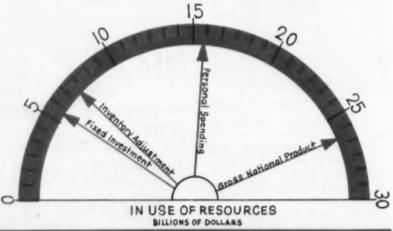
Automotive . . . The market will stay amazingly close to the

1955 record. There are three strong reasons backing this conclusion. Over 33 million cars on the road over six years old offer a substantial replacement market. There is a large increase in population requiring transportation. Higher standard of living contributes to automotive demand.

Most auto leaders predict that business will be about the same in 1956 as it was this year. They contend that continued prosperity will assure an undiminished market. Some public predictions range even higher.

Appliances . . . No industry reflects the value of high income better than does the appliance industry. Most major appliance companies are setting records in 1955, see no reason why business should do anything but increase in 1956.

This industry is aided by one of the outstanding double plays in



\$46020 N.C. THE ITECOVERY -- Intregray from 2nd Quarter 454 to 2nd Quarter 195.

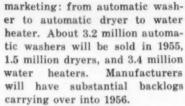


IN PERSONAL SPENDING

Important in recording the business recovery are relation of use of resources to gross national product and how personal spending habits have changed since mid-1954.

Personal spending has absorbed the bulk of the gross national product increase. At the same time, auto buying has dominated the increase in personal spending with durable goods also taking a substantial portion of increased buying.

(Thousands of units)



Should the continuing rise in gross and net personal income continue, coupled with the high rate of home building, present purchase patterns in appliances should hold well into next year.

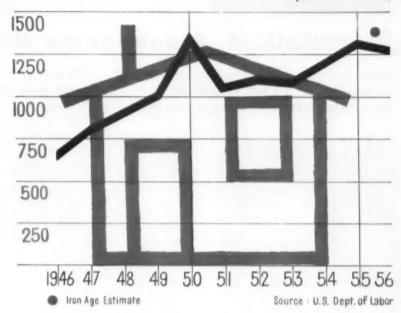
Electronics . . . Riding on television sales, the electronics industry should repeat this year's \$10 billion sales record in 1956. Bulk of the sales will be in regular black and white TV sets, with color sets holding to an orderly growth rate.

Construction . . . This industry, frequently called the backbone of the economic recovery, will not run out of steam in 1956. But the spectacular growth of recent years will probably level off. This means about 1.3 million new homes will be started and industrial construction will run at a little less than \$700 million a month. Only federal and state government expenditures for schools, roads and other purposes, now running at about 1.2 billion a month, will tend to rise next year.

Prices of home building materials are inching up, making new homes more expensive. But recent measures tightening home buying regulations will be scrapped at the first sign of a real slackening in home building.

Machine Tools . . . This industry confidently expects its first peacetime \$1 billion shipment year in 1956 and 1955 will hit \$900 million. Three government programs will give the heavy machine builders a shot in the arm. They are: (1) Navy propulsion production equipment, (2) Air Force "long lead time" machinery procurement, and (3) proposed purchase of large machine tools by GSA.

Civilian demand should continue good and incoming orders are ahead of shipments. Backlog is now 50 pct over same period of 1954. This industry got an unex-



pected lift from the Machine Tool Show which stimulated shops to increase output—through latest machine tools. Backlogs are now into March.

Aircraft . . . Nation's aircraft industry will keep soaring through 1956. Sales will be near \$8 billion. Backlog for entire industry is now \$14 billion, plus huge orders for guided missiles. Sub-contractors will share about \$5 billion in business from aircraft manufacturers.

There may be a slight dropoff from 1955 activity. Military
air units are now pretty well
equipped with jet planes. The new
"century series," planes with
numbers starting with F-100,
probably won't reach a high production rate during 1956. Military
will continue to be biggest customer, but passenger plane orders
are at an all-time high with deliveries scheduled through 1959.
New orders for jet planes are due.

Road Building . . . Serious congestion and pure politics will prod the demand for better roads and more road building machinery.

Higher rate of expenditures for highways is indicated by at least one important fact: Fourteen states raised their gasoline taxes this year. Most of the added revenues are expected to go to roads.

Congress will be asked again to consider legislation leading to a vast new road building campaign. Estimates of the federal contribution range upward from \$30 billion. Even without new legislation, the government is committed to contribute \$875 million in this fiscal year for more roadbuilding.

Defense . . . Government outlays for defense will stay high in 1956, despite attempts of economy advocates to trim as much as \$1 billion from the total \$34.5 billion military budget.

Defense Sec. Charles Wilson is telling the White House budget jugglers they will have to look elsewhere for places to cut the huge (\$63.5 billion) cost of running the government. Outlook is that the Pentagon will get the \$34 billion-plus sum it will ask for in January.

Farm Equipment... Next year's farm income, state and national controls, tariffs and subsidies all loom as important factors in determining how much farmers will invest in 1956. Estimates now indicate buying will be off 5 to 10 pct compared with this year.

WAREHOUSES: Caught in the Middle

Last to feel good market, now feel shortages most... This year started slow, but last half will make up for it... 1956 looks good with big customers staying in warehouse market—By D. G. Picinich.

♦ "WE'LL HAVE just about a reverse situation on inventory going into first quarter '56 compared with what we had the same time a year ago. We're expecting the pinch to show up noticeably on heavy demand items like plate, structurals, sheet—and to some extent bars—and mill delivery carryovers of up to six weeks on these products going into January won't help our situation any."

A major midwestern warehouseman, the speaker, added these factors to back up his estimates of an upcoming tight inventory picture at warehouse level early next year-(1) Nine months ago most warehouses were seriously concerned about heavy inventory stocks on hand-a carryover in large measure from generally poor sales showings through most of last year; (2) today-most warehousemen are becoming increasingly concerned about steady dips into inventory which began with the general business spurt last spring, have kept up at a steady pace ever since.

No Inventory Buildup

Coupled with the continuous drain on their overall inventories, which, in the case of one large Chicago warehouse, has amounted to 25 pct so far this year compared with a year ago, warehouses have had little opportunity in the past six months to build any inventory on such fast moving items as heavy or light gage plate, wide flange and standard structurals, hot-rolled and cold-rolled sheet. and carbon bars.

Mill deliveries on these products are moving immediately into consumer hands, giving warehouses no chance to build up stocks for the future.

With consumer demand for

plate, structurals, hot-rolled sheet, and hot-rolled bars currently outstripping mill deliveries, warehousemen see little chance of catching up on these product inventories for months to come. Even those who have attempted to ascertain from mills what they might expect in the way of first quarter '56 steel allocations haven't gotten very far to date. In general, they have been told by the mills that they can expect to get less steel early next year than was received on allocation this year.

So far, warehouses generally are voicing few complaints regarding their inability to get steel which is already on mill order books. One of the biggest headaches at the moment is that of maintaining a "good mix" on heavy demand items—of trying to fill the stock gaps on popular grades and sizes. Up to now it's

been a losing battle, most warehousemen agree.

Delayed delivery time, it is conceded, is a paramount problem plaguing the warehouses along with most other major mill consumers.

Delivery Delays

On plate and structurals, two of the "hottest" items in demand at the moment, mill deliveries in some instances are running up to 60 days in arrears. On the average, delivery time is averaging closer to four to six weeks.

Warehouse sales volume this year, it is generally agreed, should hit very close to the peak year of 1953. Remarkably, perhaps, this situation has come about within the past six months alone.

Tightened mill schedules, lower inventories in consumer hands, plus a generally favorable economic climate, are cited among



WAREHOUSEMAN selects stock from dwingling inventory. Bars are not as tight as plate, structurals and sheet but generally strong demands in the face of limited deliveries prevent any warehouse inventory buildup.

key factors which spell out a 35 to 40 pct increase in warehouse business over a year ago.

Dollarwise, the industry expects this to be the best year on record. Recent hikes in warehouse prices in July coupled with some advances a year ago will show up in larger dollar volume on the ledger books by year's end.

Next Year Good

For an industry which had fallen off as much as 50 pct during last year from sales levels established a year earlier, the warehouse comeback has been "extremely gratifying," in the words of one executive.

More than that, it's generally conceded the spurt will hold well into the first half of next year. Right now, most warehouses expect to see little slackening in demand from such key consumers as the auto industry, farm equipment manufacturers, the machinery fabricators, and the construction industry.

One steel company official recently estimated that the industry this year will handle some 15 million tons of finished steel. This would amount to around 2 million tons over the 1953 estimate and would come to about 20 pct of the National total output. This would include all types of finished steel and would almost double the finished steel tonnage shipped to warehouses in 1946.

Close to Record

This doesn't mean, however, that greater receipts of mill finished steel at the warehouses by year's end will up this year's sales volume level to top the record '53 market. Industry spokesmen point out this might have been the case if the first quarter this year had been as strong saleswise as the rest of the quarters.

On a number of products, warehouse inventory and mill delivery schedules are bouncing along with a minimum of problems.

Good stocks on hand are reported in commercial tubing, galvanized sheet, cold-finished bars, with CR sheets holding their own.

Stainless and alloy steel products are getting somewhat of a more consumer play than earlier.

SCRAP: Luria Brothers Sold

Nation's biggest scrap company becomes a unit of Ogden Corp . . . Family-owned business now publicly-owned after over 65 years . . . No change in policy seen.

♦ WHY WAS Luria Brothers & Co., sold? The announcement generated a lot of speculation in scrap circles and elsewhere. But the answers appears to be relatively simple: it's just another family-owned business that decided, for its own reasons, to sell out.

Herbert L. Luria, company treasurer, puts it this way: ". . . we have come to the realization that public ownership is more consistent with the further future success of this enterprise and the welfare of our employees."

Joel Claster, former president, who becomes chairman under the new setup, emphasizes the change in ownership will bring no change in company policies and that the executive group remains intact. Ralph E. Ablon, former executive vice-president, becomes president.

Luria Brothers, in business for more than 65 years, was sold to Ogden Corp., New York, and becomes a subsidiary of that company. The Ogden company is an industrial outfit that owns a number of other companies, including Case Plumbing Supply Co., Tele-



CHARLES ALLEN, Jr., steelman and important figure in Luria sale.



RALPH E. ABLON, president of Luria Brothers in sale to Odgen Corp.

register Corp., and Commercial Filter Co.

Ogden's chief stockholder is the big Wall Street investment firm of Allen and Co. Senior partner in the investment house is Charles Allen, Jr., chairman of Colorado Fuel & Iron Co., the country's ninth largest steel producer.

Mr. Allen, shy and reticent, but no man of mystery, also is a director of the Pepsi-Cola Co., chairman of a railroad and several development firms, and a board member of companies in electronics, transportation, and other fields.

Purchase price was not disclosed. But Luria, biggest iron and steel scrap company in the U. S., has assets of about \$20 million. Average annual net income for the last five years was about \$2.5 million.

Luria Brothers got its start in 1889 when Hirsh Luria and his sons, Alex, Max, and Abe, began collecting miscellaneous scrap. Today, the Luria payroll is numbered in the thousands.

MINERS: Don't Count Lewis Out

Mine union chieftain has suffered a mild heart attack . . . But his influence and philosophy still prevail . . . No successor in sight . . . Lewis and Moses make good management-labor team—By Tom Campbell.



MINE UNION chief John L. Lewis may have lost some of the old fire demonstrated here but he still holds tight rein over affairs of mine workers.

◆ THE OLD MAN is a long way from being out of the picture. To John L. Lewis his heart attack is a small thing. Speculation about who will take the helm from the 75-year-old United Mine Workers' leader is idle—so long as the old warrior draws a breath. Even after that his spirit and policies will carry on for a long time.

John L. does not expect to step down. His silence and lack of ado about his heart attack is symbolic of his refusal to recognize an adversary or a competitor. Further, it is known that he has made no plans for anyone to take his place —if that were to become necessary.

Nor is it probable that high level members of the Mine Workers have made any plans of their own as to who would take over. It wouldn't occur to them. And if it did, Mr. Lewis would make short shrift of any such plans.

It might be said that John L. Lewis is the last straw in the leadership of the coal union. There is no runnerup—either in public or behind the scenes. If secondary leaders were to name a crown prince they could not do so. About the best that could be done would be to point to Welly Hopkins, the union's able counsel and legal brain.

Lewis' Views Will Linger

In the past few years Mr. Lewis has leaned heavily on Mr. Hopkins for advice. But the latter has always stayed in the background. He will not change now.

Should Mr. Lewis' health deteriorate seriously, the field would be wide open for a new leader. But chances are the action and policy of the union would continue unchanged for some time; just as if Mr. Lewis were still at the helm.

Outsiders have been speculating that should Mr. Lewis leave the stage, would the coal union affiliate with the proposed AF of L-CIO combine? Such a move is more than unlikely. It just won't happen. Mr. Lewis has already aired his views on the would-be merger. He promises that it will part "like a rope of sand" under stress and strains. If he believes that way, it is a safe bet his followers believe likewise.

Lewis-Moses Team

This is no obituary of dynamic word-maker Lewis, who got his legal and negotiating know-how sharpened to a high pitch by the late Henry Warrum, one-time general counsel for the Mine Workers. In inner union circles Mr. Warrum gets the credit for writing the paragraph covering employees' right to join organizations of their own choosing in the National Industrial Relations Act (NIRA).

It is a long jump from NIRA days to the current bargaining setup in the soft coal industry. Mr. Lewis and Harry M. Moses, head of the Bituminous Coal Operators Assn., meet whenever the time is ripe for contract making or changing. The last time was recently when Mr. Lewis quietly asked for and got a \$2.00 a day raise—the first in more than two years.

The Bituminous group is composed of most Northern and some Midwestern operators, including steel captive mines. Generally

EDUCATION

Southern mine operators follow the lead of Mr. Lewis and Mr. Moses—a condition not to the liking of the Southern group.

What will happen to Mr. Moses' group if Mr. Lewis should pass out of the picture? The answer is simple: not much. The soft coal operators will lose a tough bargainer, a fighter for the miners and—according to some mine owners—a stabilizing force in the coal industry.

Bitter Days Recalled

As one unnamed operator said recently, "We are doing business with the Mine Workers, not clowning." While it might take time and patience on the part of both Mr. Moses and whoever follows Mr. Lewis, both sides have that ingredient—both learned it the hard way. That learning has produced a stabilization in coal undreamed of years ago. Less than 20 years ago, pitched battles were commonplace.

There are many in and out of the coal industry who do not see eye-to-eye with Mr. Lewis and Mr. Moses. But as long as Harry Moses runs the show for the Northern soft coal operators and makes a good contract with the UMW, there is little that other operator groups can do except sputter and sign with underbreath protest.

It is unlikely that the Bituminous Coal Operators Assn. will suffer any real setback should Mr. Lewis step down. The going would be rough but only temporarily. Under the leadership of Mr. Moses, association directors have found little to quarrel with.

Lewis Still Tops

One thing seems certain: Mr. Lewis may have had what he chooses to call a "mild" heart attack. Yet it is serious enough to cause a man of his age to slow down. But his word is still law, and his views will echo long after he is gone. At least in the affairs of the United Mine Workers.

Meanwhile, union and industry leaders are enjoying benefits of a good year after several years of relative slump. Coal exports are approaching the record set in 1947 and the '56 outlook is good.

INDUSTRY: Adult Study Pays

Courses can cost next to nothing . . . Federal subsidies help pay the bill . . . Both management and production groups benefit . . . Wide range of subjects covered.

• ADULT education in industry is going over big. It can cost little and pay good dividends. Small and medium size companies working on a limited budget are finding that for a little effort and a relatively small investment they can have an adult education program among their employees.

Any company can set up a program which will be financed by the municipal board of education if they have 20 or more employees interested in studying the same subject directly concerned with their jobs.

Courses in such varied fields as human relations, blueprint reading, public speaking, steel mill operation and basic economics are currently being given in plants throughout the country.

Application is made to the board of education which, if it approves the course of study, will appoint and pay an instructor. The local boards are in turn subsidized by the Federal government under the Smith-Hughes Ant

of 1917 as amended by the George-Dean and George-Barden acts.

The usual procedure for companies taking advantage of this is to furnish space in their plants for classrooms and make available skilled supervisors and mechanics as instructors whenever possible. The latter also are paid by the municipal board of education.

Legislation permitting the program specifies, however, that if at any time during the course the student body drops to less than 10, the course is cancelled. The average course is 144 hours although many require fewer hours. A good indication of the serious attitude of the men who volunteer for the study is the fact that attendance at the courses averages between 75 and 90 pct.

A large number of companies have found the program so effective that they have undertaken to back a regular curriculum of courses each year. Some are entirely financed by the municipal board of education.



SCENES like this are enacted all over the country in industry-sponsored adult education courses designed to better equip employees of all ranks.

CHARITY: How Cleveland Gives More

City founded Community Chest 38 years ago . . . Single drive keeps contributions high . . . Loaned executives, volunteer team captains, assure top level leadership . . . Payroll deductions help—By T. M. Rohan.

 THIRTY-EIGHT YEARS ago a group of charity-minded Cleveland businessmen decided to try a new tack in charity fund raising.

Led by an aggressive insurance executive, the late Martin A. Marks, and the Chamber of Commerce, they lumped the needs of all deserving Cleveland charities into one figure and mapped an all-out, one-shot drive with a goal of \$3.4 million.

To their amazement, corporations and individuals, greatly relieved at a single appeal rather than a dozen individual approaches, far surpassed the goal. Contributions ran over \$4 million and the first Community Chest in the U. S. was off to a flying start.

This pattern of industry leadership for a single drive has been adopted from coast to coast with almost universal success.

Industry Leads

Today, with business and industry leaders of "Division A" carrying 70 pct of the load, Cleveland's Community Chest is on an assembly line basis. With hard-

headed businessmen in charge, industry yardsticks for contributions are developed in advance with a formula. This year's drive, which is ending this week, has a goal of \$8,110,000, up 7 pct from last year.

This is what one trade association executive has to say about the drive:

"We in association work are used to daily badgering our members to do some kind of volunteer work and we know all the dodges even before they start begging off. Yet on the Community Chest the executives actually compete for the job and they have to work their way up the ladder to the top jobs. You couldn't buy the volunteer executive talent they've got over there for a million dollars."

At the Chest headquarters, business analysts thoroughly at home in the realms of corporate finance, donating tax free dollars, amortizations and allowable deductions, show corporations how they can give more with less financial pain.

Top business executives who are team captains are familiar with how each company is doing, how charity-minded its executive group is, know where and how much pressure should be applied.

Through their efforts, Cleveland has consistently stayed among the top ten cities in the country on per capita contributions and among the lowest in operating expenses.

In Cleveland, the "corporate yardstick" for rating company contributions is done for 114 trade groups by taking the total company contributions in each group and dividing it by the number of employees in the group.

Highest per employee contributions in industry generally are in raw materials handling where a relatively small force handles huge dollar volume.

Who Contributes

In the ore industry, for example, the company contribution hits \$156.74 per employee with scrap next at \$28.46. Steel producers, machine tools, metal fabricators and general machinery equipment makers are bunched between \$5.29 and \$7.14. Banks average \$36.11 per \$1 million deposits; offices and mercantile buildings \$280 per \$1 million tax valuation; department stores \$678 per \$1 million net sales.

Corporation solicitation is done at executive levels by men in the same industry with comparable stature in their own companies.

One of the most significant phases of the Chest campaign in Cleveland is the "loaned executive" plan, in which various companies loan executives to work on the Chest staff on a yearly rotation for a period of three months through the end of the campaign. Contacts made in the program frequently are invaluable in the "loaned" executive's business and professional life, an important incentive.

Are You Giving Your Share?

Cleveland's Schedule of Generous Giving for Individuals

Salary Range						h	A	0	8	ł	1	G				rous
\$10,000									۰				0	0		\$113
12,500																
15,000					0					,					0	267
20,000																
25,000																
30,000					0								0		0	750

Corporate Yardstick for Companies

(Per employee average)

Auto Manufacturing	\$2.89
Iron and Steel Forgings	5.07
Foundries	4.49
Machinery and Equipment	7.46
Metal Fabricators	5.29
Scrap	28.46
Ore	156.74
Steel	6.79

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HELICOPTERS: How Long Is A Mile?

Door-to-door travel promises big future for rotor craft . . . See 36.9 pct of fixed wing schedules taken over . . . But noise and landing field problems must be licked first—By G. J. McManus.



Above: HILLER Hornet features ramjet propulsion. Right: PIASECKI helicopter takes Tampico flood victims. Company models have starred in defense, disaster work.



BIGGEST Japanese whale catch in 18 years was made with the aid of helicopters. Aluminum Company of Canada completed five years of surveying in 20 helicopter hours. Los Angeles Airways expects to be carrying a million pounds of mail a month by helicopter at the end of this year./

These are helicopter stories on the plus side.

On the other side, present day helicopters are noisy and expensive to operate. They can't fly in bad we at her because they're not equipped for instrument flying. Scheduled operations are confined mostly to existing airports because of regulations and a lack of downtown airports.

How bad are the drawbacks? How real are the achievements? What exactly is a helicopter and how does it work?

The problems are real, but some answers are in sight. But helicopters probably won't make significant inroads into regular air schedules until the 1960-65 period.

How They Work

Achievement of helicopters, particularly in military and disaster rescue work, have been spectacular. Civilian lines are growing but are still in the infant stage.

In operation, the helicopter is both lifted and driven by one or more rotors. These turn on a vertical axis when the plane is moving up or down. They are tilted forward or sideways for horizontal movement. Helicopters cruise at about 100 mph, have hit 180 mph; will travel about 300 miles.

Sales Increase

Helicopter sales in 1954 totaled over \$155 million. Industry backlog runs about \$550 million. Employees number 15,000.

Nine major helicopter manufacturers are producing or experimenting for the military services. Models run from 2-3 place jobs or training, rescue and observation; 10-16 passenger units for light transport service; and big types seating 40-50 passengers.

There are 11 models in production, 14 in prototype and 9 in design-development stage. These include large types to serve as flying cranes for military services and as equipment movers for construction companies.

Helicopter mail service has been available in Los Angeles since 1947; since 1949 in Chicago; and since 1952 in New York. In July 1953, the first scheduled helicopter passenger, mail and cargo service was established in New York. Another is now authorized in Los Angeles.

Cost A Problem

Helicopter service is working between airport and city in Pittsburgh and Cleveland; will be started in Indianapolis this year. Belgium has helicopter passenger service to the Netherlands, France and Germany.

Expense is a big problem for helicopter operation. One study places the overall seat-mile cost of an 8-passenger helicopter at 20¢. This is five times more than the cost for twin engine, fixed wing planes of the Convair type.

A 30 passenger helicopter with a 65 pct load factor would give direct costs of 8.5¢ a passenger mile and overall costs of 12¢. This would be 3 times the cost of a conventional short-haul airline but a sufficiently high fare might be justified on the grounds of door-to-door travel. Bigger ships are a must for economical helicopter passenger service.

Noisy Things

Another problem is noise, inside the plane and outside. This is hard on passengers, draws objections from home owners who would be near proposed heliports.

Use of ram-jets or gas turbine engines may be the answer to the noise problems. Jet engines, mounted on rotor blade tips, eliminate noisy transmission and reciprocating parts. Heavy fuel consumption is a difficulty with the jets.

Helicopter Sales and Operations

	1952	1953	1954
Estimated Sales (Millions of Dollars)	\$165.0	\$190.0	\$155.0
Estimated Backlog (Millions of Dollars)	\$355.0	\$450.0	\$550.0
Number of Models:* In production In prototype stage In design stage	13 3 9	14 10 8	11 14 9
Plant Area (Thousands of Square Feet)	1,792.8	1,887.7	2,161.5
Number of Employees	13,776	14,977	14,460
Payroll (Millions of Dollars)	\$51.4	\$86.4	\$71.6

* As of December 31.

Source: Aircraft Industries Assn. (Seven Manufacturers).

Turbine engines appear better adapted than reciprocating models to the heavy-load operations of helicopters. There is less vibration; warm-up time is reduced; power units are compact and easily removed. A lack of specifically designed engines has hampered helicopter development in the past.

Still another problem of the helicopter operator is instrument navigation. The pilot of a rotorcraft may make as many as 80 control movements a minute. This compares with 3 to 4 movements for

fixed-wing aircraft. Ordinary instruments need to be simplified and otherwise adapted to helicopter use.

Without instruments, the helicopter airline is subject to schedule interruptions in any kind of overcast. Work is underway to provide adequate navigating aids for the rotorcraft, but operators feel that regulations designed for fixed wing ships could safely be relaxed in their case.

The question of regulations is being pushed by helicopter men. They say that all states except Georgia define aircraft broadly enough in statutes to take in helicopters. Only four states, California, New York, Tennessee and Vermont, recognize helicopters as a separate and distinct form of aircraft. It is contended that helicopters are governed by landing field, altitude and other specifications that are too stringent.

AGAINST Helicopters craft.

"I had three more hours in Newark to transact business." (Time saving in congested areas is big talking point. 'Copters cruise at 100 mph but gain on door-todoor time.)

FOR Helicopters

"I look forward to the time when your service replaces subways and buses." (Probably won't ever happen. Helicopters should help to disperse business, are not seen now as mass transportation devices.)

"Airlines could do much to increase use of your service." (Airlines are watching helicopters closely. One estimate sees rotary wing craft taking over 36.9 pct of fixed wing schedules.)

"I enjoyed the novelty of slow motion over New York." Ability of 'copter to hover fits it for pipeline inspection, rescue work and many other special jobs.) "You should distribute cotton for passengers' ears." (Noise is big bugaboo, both for passengers and home owners. Use of gas turbine engines or ram-jets may help.)

"Figure out some way I can avoid using bus lines to 42nd St." (Downtown heliports are needed for fullest benefit. Noise, uncertainty over requirements have checked heliport development. Helicopter men are asking eased air regulations.)

"This makes me feel as if I were air slumming." (Some improvements will have to be made in interior decor. Not a serious problem and short duration of flights lowers comfort requirements.)

"Too much interference with mail bags being loaded, unloaded," (Commercial helicopters are too small, depend heavily on mail and freight. Bigger craft needed for economical passenger service.)

Go Straight Up

Another point that has retarded industry growth: No one knows exactly when design stability will be achieved. This is not just a matter of eliminating bugs. Radical new concepts keep turning up.

Convair's "Pogo," which goes straight up on propeller power; Convertiplanes, which operate as fixed wing or helicopter craft; Hiller's Flying Platform, which gets its lift from a fan: these and others open up broad design possibilities. There is even talk of anti gravitational devices.

Until things settle down a little, there is bound to be some wariness.

DEFENSE

Dispute:

Misleading, say Democrats of defense contract list.

Here's the history of a dispute that may bring a public airing of defense contracts.

In 1951, the Defense Dept. began publishing semiannually a list of the largest defense contractors. It was compiled cumulatively, so that General Motors, the nation's largest corporation, usually wound up on top. The list was stopped in January, 1954, on the grounds it was too costly.

Early this year, the Senate Banking Committee and the House Small Business Committee both asked it to be reinstated. Sen. James W. Fulbright, Banking Committee chairman, made the formal request, asking specifically that the analysis be brought up to date. "I am particularly interested in the period from June, 1953, to Jan. 1, 1955," he said.

So the Defense Dept. complied with a list of the 100 firms who received the most business from the government in that period. General Motors was off the list, because its contract cancellations exceeded new contracts by \$58.9 million during that period. This list was not cumulative, although Defense Dept. officials noted that if it had been, General Motors would have headed the list.

Senate majority leader Lyndon Johnson waxed indignant. His staff added the whole business up and came up with another list of 100 largest contractors—cumulative—to show that since 1950, GM has received contracts totalling \$6,638,900,000. Second largest is Boeing Airplane Co., with \$5,167,800,000, followed by Douglas Aircraft Co., Inc., \$3,909,600,000.

The Defense Dept.'s latest list, the senators say, contains "misleading information."

In addition to GM, 44 other firms were left off the list of 100 biggest contracts which should be there if the figures were compiled cumulatively, the committee says.

Navy Switches Shafts

Alloy steel propeller shafts of new type, installed by the Navy on a number of its latest ships, will be removed and replaced with conventional shafts at a cost of about \$12.2 million. Outboard shafting only, the Navy points out, is to be replaced. The new shafts were installed in two aircraft carriers, including the Forrestal, five frigates, and six destroyers, including three still under construction. Replacement cost is estimated at less than one pct of the total cost of the vessels.

The high-strength alloy steel shafting which will be removed met Navy specifications designed to permit weight savings without reduction in performance. Shafting of reduced size was intended to withstand higher stresses than in the case of conventional shafts.

A-Power:

Service squabble looms over nuclear seaplane.

Top-rankers in the Air Force and Navy are all set to tussle for control over the still unbuilt seaplane powered by an atomic engine.

Naval aviators have been urging that the initial use of an airborne nuclear engine be in a seabased aircraft to be flown by the Navy. It now appears certain that if such a plane is developed the Air Force will want it for strategic bombing missions.

Aircraft with atomic power plants have as high a priority with the Air Force as does the long-range missile project, says Gen. T. D. White, vice chief of staff for the Air Force. He suggests that a plane so powered would be a possible answer to enemy long-range missiles.

See Strategic Role

A large number of planes with atomic engines could be kept aloft as a retaliatory force, he believes. They would be situated so as to start their own strikes as soon as the enemy began to launch an attack.

He considers a nuclear-propelled seaplane a likely prospect for the handling of strategic bombing tasks. Shielding to protect the crewmen would presumably be less of a problem in a seaplane, and the dependence on expensive land bases for heavy bombers would be reduced.



NEW WEAPON for psychological warfare branch of the Army is this typewriter-like device which will permit completely non-linguistic personnel to reproduce messages in any of fifty foreign languages.

Foreign Steel:

Fiat lands contract for new Venezuela plant.

Steel-making capacity in Venezuela is slated to rise to 421,000 tons annually under terms of a new contract signed by the Venezuelan government and the Fiat Motor Car Co., of Turin, Italy.

Fiat's low bid of \$128 million won out over bids from six other nations, including the United States.

Venezuela's most pressing needs are for rail, reinforcing bars, wire, rods and nails, cast iron pipe, welded and seamless tubing and electrical conduit.

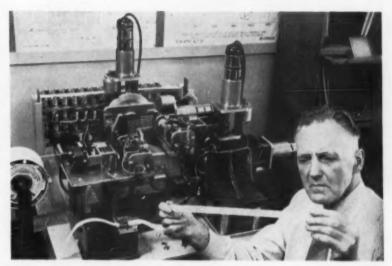
Eventually, Fiat intends to emphasize production of hot and cold rolled sheets, tinplate, and galvanized sheet.

The new plant will be located at the junction of the Caroni and Orinoco Rivers. All production raw materials are to be provided from Venezuelan sources. In addition to the 65 pct pure iron ore from Cerro Bolivar, both coal and limestone are available and will be brought by ship from Eastern Venezuela.

Three Siemens-Martin furnaces of 175 tons capacity each will be used. In addition, there is to be a reversible blooming mill of 40-42 in. roll diameter, two rolling mills for light structural sections and rails, and three combined mills to roll reinforcing bars and wire rods.

A foundry of 40,000 tons annual capacity will turn out cast iron pipe.

Fiat's bid includes construction of all subsidiary, maintenance, and operational installations relating to the plant. These include special docks, unloading equipment, service railroads, offices, roads, warehouses, repair and maintenance shops, and laboratories.



PUNCHED TAPE is instructions to Bell Telephone's M-4, a machine for automatic wiring of complex electronic equipment. A different tape results in a different series of solderless connections.

Tax Amortization

Certificates of necessity issued for defense projects during the most recent tally period, Sept. 22-Oct. 5, totaled only \$93.1 million. This dwindling amount brings the grand total of rapid tax amortization granted to \$31.3 billion.

Among the major projects approved on the new list are:

Bethlehem Steel Co., heavy steel plate facilities, \$30,100,000; Mines Development, Inc., uranium processing facilities, \$1,690,450; Rare Metals Corp. of America, uranium ore processing facilities, \$2,354,-276; Bath Iron Works Corp., facilities for fabricating structural assemblies for Navy vessels. \$2,117,721; Pima Mining Co., copper mining and concentrating facilities, \$8,873,000; Braniff Airways, Inc., air transportation, \$19,-271,000; Powder River Pipeline, Inc., oil pipe line facilities, \$1,125,-000; and The New York, New Haven & Hartford Railroad, railroad bridges, trackage and communications equipment \$8,600,000.

Super Alloys:

Allegheny Ludlum anticipates needs with new facility.

Allegheny Ludlum Steel Corp. has opened a new melting department for the production of high alloy steels. The new facility, located at the company's Watervliet, N. Y., plant, is capable of producing 250,000 lb per month of high performance alloys.

According to A-L market studies, the department's output potential for high quality superalloys, or tool steels, or high quality stainless steels is about 10 times as much as industry has been using up to now. Further, the facility is set up so that it can be expanded four times.

Thus, Allegheny Ludlum is anticipating industry's future needs and overcoming the bugaboo of availability for consumers who need substantial quantities of very high quality super alloys.

"No breakdown in 14 years with Morse Roller Chain"

-says Ajax Electric Company engineer





Furnace interior, from end. Main drives lie parallel along bed. Transfer chain drives convey fixture carriers.

←Operator hangs parts on fixture holder. By changing sprocket or adding or removing links, timing of drives can be altered.

"We've worked with Morse Chains for 14 years, and have never experienced a breakdown of this product during that period. And, in our complex installations of electric salt bath furnaces, Morse is giving us excellent results."

Field Engineer Aiax Electric Co. Ajax Electric Salt Bath Furnaces point up how roller chain can save operating costs, cut your downtime, give you flexible, dependable power.

Ajax Electric Co., Philadelphia, makes electric salt bath furnaces, used to temper metals. These furnaces use roller chain throughout for conveying and power transmission.

Alkali cleaner, molten salt, steam—each is a potential threat to the more than 2000 feet of chain used. Yet, for 14 years, drives like these have performed efficiently, without a single breakdown. (Read statement below.)

Morse Roller Chain instantly adaptable

The metal parts hardened in these Ajax Furnaces often require "dip" periods that vary in length. By changing the number of links in a drive, or sprocket diameter, each step can be speeded up or slowed.

You, too, can get superior power transmission with Morse Roller Chain. Precision-made in all standard sizes and pitches. A wide variety of standard and special-purpose attachments are available.

Check these advantages of Morse equipment:

- √ Long service life
- √ Low operating cost
- √ Requires minimum maintenance
- √ Wide range of types and sizes
- √ Precision construction

Literature, engineering help FREE

Write today for Catalog C 51-50, or free consultation. Morse has skilled engineers available to help you solve practically any problem involving transmission equipment: Roller Chain, Hy-Vo Chain, Silent Chain, Sprockets, Clutches, and Couplings.

MORSE CHAIN COMPANY INDUSTRIAL SALES DIVISION ITHACA, NEW YORK

MORSE

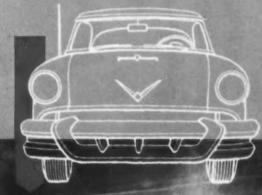


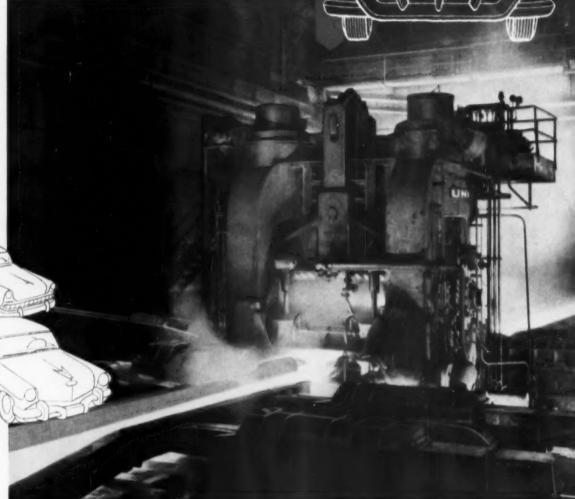
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ROUGHING STAND
FOR
HOT STRIP MILL





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ENGINEERING AND FOUNDRY COMPANY

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SUBSIDIARIES: Adamson United Company, Akron, Ohio Stedman Foundry and Machine Company, Inc., Aurora, Indiana

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down on the farm-

Rocks and bumps—exposure to all kinds of weather—they're part of the everyday job of International tractors and earthmoving equipment—and part of the everyday jobs of Federal Ball Bearings to keep them rolling.



so much of industry turns on **FEDERAL** ball bearings

Tractors and escalators—cars and planes—if people and things are moving—Federal Ball Bearings keep them moving. In your home, office or factory, you'd probably find some of the hundreds of bearing types that this 50-year-old company is now making in over 12,000 sizes.

When Federal Ball Bearings are a part of so many things you use, shouldn't they be a part of the things you make?

THE FEDERAL BEARINGS CO., INC. . POUGHKEEPSIE, N. Y.

or up an escalator-

Getting thousands of workers in and out of subways, bus terminals and skyscrapers puts repeated, concentrated loads on Otis escalators and elevators. Federal Ball Bearings help take the ups and downs in quiet stride.

Have a look at the 175 pages of ball bearing information in Federal's catalog. Just drop us a line and we'll send you your copy.





ederal BALL BEARINGS

One of America's Largest Ball Bearing Manufacturers

PLANNING

Report to Management

Tax Aid in the Fine Print

Your company can expect little tax relief from next year's legislative sessions. With Presidential elections on deck, reductions will go mostly to the big voting body—the group lying under the \$6000-a-year mark.

This doesn't mean you can forget about tax laws during the next year. For one thing, there will be a definite jump in spending when personal income levies are cut. You will want to know when the big day is due.

And corporate earnings are now governed by a new tax code. You should follow tax actions under this code. You will want to plan your operations for compliance and fullest benefit.

What Was Wrong

The 1939 Internal Revenue Code provided penalty taxes for companies that retained too big a slice of corporate earnings. Idea was to prevent retention of corporate gains for the purpose of avoiding personal surtaxes on shareholders.

In principle this provision was sound but application worked unfair hardships. The company had to show an immediate need for retained earnings. You could be subjected to penalty taxes on all retained earnings, not just those ruled "unreasonable."

And the burden of proof rested on the taxpayer. You had to show there was no unreasonable accumulation. You had to prove there was no intent to evade.

What Was Done

Last year Congress revised the Internal Revenue Code. Under new provisions, you can set aside earnings for anticipated as well as immediate needs. Court rulings indicate earnings may properly be retained for renegotiation,

inventory, working capital needs as well as for expansion and growth.

You can now shift the burden of proof to government by filing a statement of plans for retained earnings. And under the 1954 code, only the amount deemed unreasonable is subject to the penalty tax.

More recently the code was modified to make the burden of proof provision retroactive. The new law operates in cases springing from the 1939 code and not tried on their merits before August 11, 1955. Importance of this time factor is evident when you consider that no court decisions have been rendered under the 1954 code on accumulated earnings provisions.

What To Do

It isn't too soon to go into a huddle with a tax expert on any contemplated diversion of earnings. You can set aside funds for anticipated needs. There does not have to be an immediate investment.

But there must be definite indication that funds will be needed. You may be asked to provide work papers, reports, corporate minutes or other documents showing active consideration of expenditures. A vague notion is not enough. Get something in writing. Don't put off planning sessions.

Remember too that your company will receive special attention if less than 70 pct of earnings go into dividends. Companies that invest earnings in properties unrelated to their business also get a close look.

And keep your thoughts pure or to yourself. The corporate taxpayer may avoid the penalty tax, even where accummulated earnings are ruled excessive, if he can show there was no intent to avoid a surtax on shareholders. The law recognizes goodwill.

INDUSTRIAL BRIEFS

Sales Office . . . Detroit Steel Corp. has transferred its southeastern district sales office from from Richmond, Va., to 205 Church St., Charlotte, N. C.

Trackmobile . . . A vehicle equipped with two sets of wheels for use on either standard gage railroad tracks or normal roads is now available from Whiting Corp., Harvey, Ill. The steel railroad wheels can be raised and lowered in 90 seconds, as can the rubber road wheels depending on which media the vehicle is operating. It is designed for flexibility in moving all types of traffic in factory yards.

Chemical Plant . . . B. F. Goodrich Canada Ltd. will start construction on a proposed new \$3.5 million chemical plant near Niagara Falls, Canada, early next year. Completion is expected early in 1957. The principle production item will be Geon polyvinyl plastics.

Atomic Control . . . Atomic Instrument Co., New York, has acquired a controlling interest in Kaye Development Co., Inc., South Norwalk, Conn., makers of electronic color evaluation instruments. No changes in operating management are planned according to Atomic president Leonard V. Cronkhite.

New Address . . . Phelps Dodge Corp. has moved its New York offices to 300 Park Ave.

Lab Expansion . . . General Electric has expended \$500,000 on an expansion program for the testing facilities of its switchgear and control division. Just completed, the improved lab can now boast of equipment that will produce short circuit currents as high as 100,000 amperes at 700 volts.

New Building . . . West Coast Div. of H & B American Machine Co., Inc., has almost completed construction of a new building in Culver City, Calif., which it estimates will increase its capacity for producing structural parts for military aircraft by as much as 50 pct.

Contract . . . A \$1.225 million contract to manufacture radio sets for micro-wave relay has been awarded to Radio Receptor Co., Inc., Brooklyn, N. Y., by the Signal Corps Supply Agency of the U. S. Army.

New Film . . . Proper selection and use of portable pipe threading machines is the subject of a new color 16 mm sound motion picture available to trade groups, associations, and educational groups from Oster Mfg. Co., Cleveland, Ohio.

Buys Company . . . Spert. Products Inc., Hoboken, N. J., makers of electronic consumer products, has acquired the Leukart Machine Co., Inc., Columbus, Ohio, manufacturers of special automation equipment, for an undisclosed purchase price. Leukart will continue to operate under the same executive personnel.

Big Order . . . What is reputed to be the largest single order for structural steel for a building in Worcester, Mass., has been placed by the Turner Construction Co., New York, with American Bridge Div. of U. S. Steel. The 5000 tons of steel involved will be used in building a home for the State Mutual Life Assurance Co.

Steel Coins . . . The Central American country of Costa Rica, which has been using 5 and 10¢ stainless steel coins for several years, announced that in a short time they would issue one and two colones coins of stainless steel. A colone is worth about 18¢.

Data Processing . . . An electronic data processing system with the well known UNIVAC unit as its central computer is scheduled for installation in the executive offices of The Carborundum Corp., Niagara Falls, N. Y., late in 1956 or early in 1957. Initially the device will serve the data processing needs of Carborundum's U. S. offices with plans calling for eventual availability to divisions in Canada and overseas.

Automation . . . The Automatic Molding Machine Co., has opened a new plant in Los Angeles, Calif., to manufacture high speed, automatic compression molding machines.

Prexy... Frank H. Hamlin has recently been elected president of the Farm Equipment Institute. Mr. Hamlin is also president and general manager of the Papec Machine Co., Shortsville, N. Y.

New Plant . . . Rockwell Mfg. Co. will spend \$1 million on the construction of a 100,000 sq ft building at Porterville, Calif., to be used for the assembly, repair and storage of Rockwell meter and valve products for western distribution.

Purifier . . . A new mobile water purifier developed by the Corps of Engineers' research and development laboratories, Fort Belvoir, Va., is capable of purifying 3000 gallons of water per hour around the clock. The truck-mounted unit received a baptism of fire during the flood at Stroudsburg, Pa., and performed as well as expected, according to Army engineers.

New Division . . . Pioneer Engineering & Mfg. Co., Inc., Detroit, has announced the formation of a new division devoted exclusively to body engineering. Supervising engineer will be C. E. Shutte.

R for maintaining hot metal schedules

CRYSTOLON* refractories are engineered and prescribed for more continuous furnace operations, both front and back slagging

You can maintain hot metal schedules for your casting line and avoid costly shutdowns by using Norton CRYSTOLON refractories — engineered and prescribed for highest efficiency in handling neutral and acid cupola slags.

For back slagging cupolas the B is CRYSTOLON slag hole blocks. For capping the notch and lining the slag chute in front slagging cupolas it's CRYSTOLON bricks and cement.

Wherever you use it, this top-quality silicon carbide refractory material will stand up under temperatures as high as 3050°F without softening, spalling or cracking. Its extreme density assures exceptional resistance to slag penetration and attack — and it lasts 5 to 15 times longer than ordinary fire clay.

In your own foundry

these advantages mean less maintenance time and trouble for your men — and faster, more profitable metal-melting for you. CRYSTOLON bricks and blocks are made in sizes and shapes for every foundry requirement. See your Norton Representative for further facts. Or write to NORTON COMPANY, Refractories Division, 209 New Bond St., Worcester 6, Mass. Canadian Representative: A. P. Green Fire Brick Co., Ltd., Toronto, Ont.



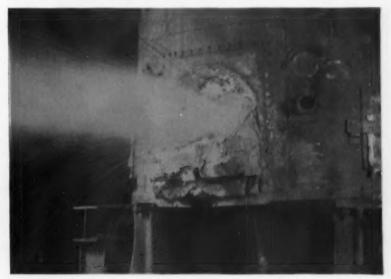
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Up to 64 hours of operation without shutdown, under severest back slagging conditions, are reported by users of CRYSTOLON slag hole blocks — like this one, on heavy duty service in a big automotive parts foundry.



More efficient, lower cost metal-melting results when crucial points are guarded by CRYSTOLON refractories — slag hole blocks for back slagging cupolas, bricks and cement for front slagging cupolas.



How Independents Buck Big Three

AMC pins hopes on "bread-and-butter" Rambler . . . Hopes to sell 150,000 of restyled, small cars in 1956 . . . Production facilities are increased . . . Packard has engineering innovations—By T. L. Carry.

• WITH COMPETITION in the auto industry increasing every year, the Independents are finding it harder all the time to survive the onslaught. So far in 1955, the Big Three has accounted for over 95 pct of the new car sales. The remainder of the market has been split between the Independents in such a way that no one of the smaller companies enjoys more than a 2 pct penetration.

More than one automaker has commented on competition within the industry and how it ultimately benefits the consumer. This, of course, is true and is the phase of competition that usually is emphasized.

But there is another, more realistic side to competition. There is, for example, the philosophy of Harlow H. Curtice, president of General Motors Corp., that there

is no assured position in the industry. An auto company either moves its market position up or is shoved down by another producer anxious to get a bigger share of the market.

Lack Facilities . . . With this type of philosophy permeating the industry, you might wonder how the smaller companies manage to cling to even a small percentage of the market.

Independents do not have the financial or productive resources of the Big Three. Even more important, they do not have the engineering, styling and research facilities necessary in today's market.

Because of lower volume of production, tooling costs are much higher per car when production is limited to perhaps 200,000 cars.

It is against this background that American Motors Corp. is entering the 1956 market with the most ambitious program it has had since the merger of Nash and Hudson.

In an effort to increase its sales, AMC is going to concentrate on the Rambler as its basic-volume or "bread and butter" car.

New Assembly Line . . . The corporation has just completed construction of separate manufacturing facilities for the popular little car and has also completely redesigned it in an effort to make it even more appealing.

Previously the Rambler was assembled at AMC's Kenosha, Wis., plant on the same line as the regular Nash and Hudson. With the separate facilities, the corporation will be able to produce 800 Ramblers a day, an increase in capacity of 60 pct.

Past experience has taught American Motors that it has a good thing in the Rambler. Roy Abernethy, vice-president in charge of sales for the Nash Div. says that in the 9-months of production in 1955, his division produced 48,000 Ramblers and could have sold another 20,000 if there had been time to do it.

For 1956, American Motors is aiming at 150,000 Rambler sales, according to George Romeny, youthful president of the corporation. Mr. Romeny does not give any figures for the total number of cars his company will produce, but says that the latest expansion gives AMC facilities for 360,000 cars annually.

Looking ahead to 1956, Mr.



PACKARD'S Caribbean hardtop will feature the industry's highest horsepower for 1956, and other engineering features. For details, see p. 83.

Copper process now cuts two plating expenses

- ♦ Buffing costs reduced by special deposits from plating process developed and improved by United Chromium
- Non-cyanide Unichrome Pyrophosphate Copper Solution also avoids costly waste disposal problem

Where there's bright chromium finishing, there's bound to be polishing. Either the base metal gets it . . . or the underlying copper or nickel plate. With Unichrome Copper, the job done in the plating tank cuts costs at the polishing wheel.

EASIER BUFFING - OR NONE AT ALL

For finishing steel products, for example, Unichrome Copper can provide a satin finish ideal for buffing. It "flows" under the wheel, covering scratch marks, buffing to high luster in a flash. Rather than buff steel, it's generally far easier and cheaper to buff this copper.

For finishing die castings, a lustrous deposit can be produced that needs no buffing at all. By switching to Unichrome Copper, one plant finishing auto parts plated copper so lustrous, it eliminated 90% of buffing which formerly had to be done on the subsequent nickel.

NO CYANIDE WASTES

Unichrome Copper solution contains no cyanide . . . needs no costly waste treatment. To many plants, this is the deciding advantage. As one typical user put it, ". . . pyrophosphate copper solution was selected because it does not present a serious waste disposal problem."

This is just one of many United Chromium developments in processes, equipment and materials which provide opportunities to cut your finishing costs... opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.





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REPORT CARD

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Subject

Cold Reversing Mills Excellent

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Ohio Rolls



THE OHIO STEEL FOUNDRY CO

LIMA, OHIO • Plants at Limo and Springfield, Ohio

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Oct. 15, 1955	105,627	25,281
Oct. 8, 1955	85,640	16,439
Oct. 16, 1954	46,253	13,258
Oct. 9, 1954	65,564	16,046

*Estimated Source: Ward's Reports

Romeny's optimism about sales next year is based on several reasons.

First, Nash and Hudson dealers have made more money this year than they did in 1954. Hudson sales, through September of this year, were 45 pct greater than they were for the same period in 1954 and Nash dealer profits in 1955 are 250 pct greater than they were in 1954.

The dealer organization has also been expanded and American Motors is continually working to increase its number of retail outlets.

In addition, the corporation is bringing out its products for 1956 much earlier than it did last year. The delay in 1955 was caused by problems which had to be worked out following the merger.

Mr. Romeny expects the demand for the Rambler in 1956 to be double what it was this year. He is confident that the corporation will be able to reach its goal of 150,000 Rambler sales.

Packard:

Innovations aim at larger market.

Another Independent, Packard Div. of Studebaker-Packard Corp., announces its luxury cars this week and it is obvious that Packard is fighting the Big Three competition with innovations.

Packard introduced the revolutionary torsion bar suspension on its 1955 cars and has added some new innovations on the 1956 model.

The new cars feature the largest displacement and most powerful V-8 engines in the industry.

The engines develop either 290 or 310 hp, have a 10 to 1 compres-

sion ratio and a 374 cu in. displacement.

Also featured in the new line is an electrical push button drive control and what Packard calls 2way interiors on the Caribbean hardtop and convertible models.

The cars with the 2-way interiors have seat cushions that are leather on one side and cloth on the other. By simply reversing the cushions, an owner may have an interior of leather, cloth or a combination of both.

Trailers:

Aluminum cuts car hauling costs.

Trucking companies which specialize in hauling automobiles from factories to dealer show-rooms have found that trailers made mostly of aluminum help them do the job more economically.

Conventional steel trailers weigh between 8000 and 10,000 lb. The new aluminum trailer weighs between 6000 and 7000 lb.

One company in Pontiac, Mich.,

AUTOMOTIVE NEWS

which presently has 11 aluminum trailers in its fleet, uses them for runs to West Virginia. Because of the lighter load being hauled, the company realizes a saving of 8 gal of gasoline.

Beats Frost Laws

Wear and tear on the tractors being used is also reduced and this cuts maintenance costs.

In addition, the company does not have to worry about overloading when frost laws are in effect. The lighter trailers make it possible to carry the same number of cars all year.

Only steel used in the new trailers is for structural support. Skids, runways, floor, sides and drip pans are all aluminum.

The trailers are being made by the Troyler Corp. in Scranton, Pa. Initial cost is higher than it would be for an all-steel trailer, but some trucking companies figure the money saved in the long run makes it worthwhile.

THE BULL OF THE WOODS

By J. R. Williams





"WHY...why does it cost us so much to make this?"

How many times have you asked this question? A simple part, an assembly or a finished product—why should it cost so much to make? Why? Maybe one answer is so obvious it's being overlooked.

This may be an answer Invisible cracks developing in parts during manufacture are too often the cause of these high costs. It isn't the cost of the rough parts themselves. It's the time and labor that go into them...setting up, machining, finishing...all to be scrapped at final inspection.

You don't have to accept this loss as "fixed." Inspection with Magnaflux during manufacture finds all cracks

when they first occur—suggests the cause and how it can be corrected—before parts are run in quantity. Before the bad ones raise your product costs to the point where you ask "Why?"

Ask to have one of our engineers show you how inspection with Magnaflux can save you money—or write for new booklet on LOWER MANUFACTURING COST.

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Can Unions Deliver Member Votes?

Leaders will call on workers to vote labor . . . And membership dues will enable unions to mount powerful political drive . . . But many doubt block voting by labor groups—By G. H. Baker.

• ORGANIZED labor is going to be a much more potent factor in politics next year.

Under Secretary of Labor Arthur Larson is reminding the Eisenhower Administration of labor's coming political power, but he doubts that the AFL-CIO merger (scheduled for December) will bring about the creation of a Labor party.

U. S. workers, despite the brawn of the organizations to which they belong, still are going to make up their political minds as individuals, he predicts.

Can't Deliver Votes . . . Congressmen of both major political parties who have tussled with union bosses declare that union officials "never could, and never will" deliver the labor vote in a block.

But drives for new members will give labor leaders more dues money and therefore more funds to spend for political purposes, it is pointed out. Individual workers will be under a lot more pressure next year to "vote labor." Keep an eye on the congressional elections in particular, as a barometer of the new labor political drive.

CIO Warns... The CIO is serving notice on Democrats in Congress that they'd better toe the line on major welfare and construction bills next year.

The union chiefs warn they expect the Democrats to "vote right" on such matters as health insurance, more federal aid to education, better roads, and more fed-

erally-subsidized housing units.

Vote wrong, and you'll lose labor support at the polls, is the broad hint presented in "Report on Congress," a new CIO publication.

Could Lose Friends . . . Pressure of this type could lose friends for Mr. Reuther. Few congressmen believe in the old myth that "labor delivers the vote." It's embarrassing to the labor bosses, but rank-and-file union members vote their own hearts and minds when they go to the polls. Threats against candidates who do not hew to the CIO line often backfire.

CIO President Walter Reuther obviously expects that a "good Democrat" in the White House would give labor everything it wants. In a new reminder to the CIO membership, he says that President Eisenhower's Administration is "more concerned with bankers' profits than with highway and school construction." The answer, he says, is to elect more of the "right kind" of Democrats.

Coal Men Protest . . . Congressmen from coal-producing areas are protesting the Administration's refusal to buy any more U. S. coal for export under the foreign aid program.

Last year Foreign Aid Director Harold Stassen announced plans to buy 10 million tons of U. S. coal for export to countries included in the overseas assistance program.

Helping Hand . . . Purpose of the purchase plan was to aid the depressed U. S. coal industry particularly in those areas where unemployment is a chronic problem.

Now it turns out that only 1,130,000,000 tons were actually bought in the U. S. and the program is being written off as "too expensive." The International Cooperation Administration (successor to the old Foreign Operations Administration) says it intends to buy all of its supplies from "the most economical source"—which means foreign sources.

See Bigger Business

- Big Business and big wages are to get still bigger in the years immediately ahead, according to an Administration spokesman. Felix Wormser, Assistant Secretary of the Interior for Mineral Resources, makes this prediction, and explains it this way:
- "Large-scale industrial companies are part and parcel of the age in which we are living. I daresay they will grow even larger as time goes on. How else can the terrifically large sums of capital necessary to provide the machinery for our mass production industries be obtained?"



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Cone submits samples of your work

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here is no adequate compromise with efficient production practices, if you are in business for a profit.

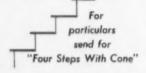
But you don't always know just how competitively efficient your equipment is. Case histories of what the other fellow is doing are sometimes garbled. At least the poor ones are not advertised. And conditions vary in all plants. Sometimes you have reason to be more concerned with what you don't want in new equipment than with what you do want. Cone believes too much is at stake for a machine to go into a line unequipped for the job, with either carbide or hss tools.

The Conomatic Carbide Development treats each job individually from standpoint of work, machine, tools, and operating personnel.

DATA FOR C	OMPARISON
PartBushing	Length%"
Machine1% " Conomatic	Hole Dia11/4"
Tools100% Carbide Tipped	RPM825
Material8620	Time14.8 Secs.
Stock Size1%"	



Conomatic



CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

Freight Cars:

Charge Tax-am program fails to check building lag.

The nation's freight car fleet has shrunk in the past five years despite \$1.5 billion in "interest-free loans" to the railroads under the tax amortization program, a House investigating subcommittee staff charges in a report sharply critical of both the rail industry and the government.

Fast tax amortization has not provided the railroads with an incentive to expand the freight car fleet, the report says, urging that some other technique be found to create a mobilization reserve.

Build Too Few

Report, drafted by the staff of a House Government Operations subcommittee headed by Rep. Robert H. Mollohan, D., W. Va., charges that:

Since fast tax amortization was instituted in 1950, 310,000 new freight cars have been added to the fleet, but 342,000 old cars have been retired.

Fast tax benefits are granted to any railroad whether the new cars are replacements or additions to the fleet contrary to Congressional intent and government rules.

Although the railroads are improving their financial positions, they have "failed completely to expand the nation's defense railway transportation potential," and that the railroads apparently want a subsidy through tax amortization to enable them to "maintain a modern railway system."

In defense, the government and the industry argue that new cars carry more than old ones.

Hit Sympathy Strikes

An amendment to the Taft-Hartley Act to prohibit company-wide sympathy strikes like the one just ended against Westinghouse Electric Corp. will be introduced in the next session of Congress.

Rep. Carroll D. Kearns, R., Pa., says he will also sponsor legislation to outlaw abuses of pattern bargaining systems such as frequently operate in the auto, steel and coal industries, when Congress reconvenes in January. Rep. Kearns is a member of the House Labor committee.

In case of sympathy strikes, the Pennsylvanian says, one answer might be to require a 120-day waiting period before a grievance in a single plant could be used as the basis for calling strikes in all other plants of a parent company.

The International Union of Electrical Workers (CIO) pulled workers out of 21 Westinghouse plants to support a grievance over time studies at the plant at East Pittsburgh.

Unions Get Wage Data

An employer is required to let a union know which employees have received merit wage boosts, as well as all other wage data necessary to police a collective bargaining agreement, the U. S. Supreme Court rules.

The high court, by refusing to review a lower court decision, in effect confirms that the American Newspaper Guild (CIO) was within its rights in requesting wage information to determine whether guild members were being discriminated against in obtaining merit raises.

The employer involved, the New Orleans Item, contended unsuccessfully that disclosure of merit pay raises would "discourage the simulation achievement among the



"We no longer have to worry about stockpiling bombs. After this one goes off, there won't be any targets left."

WASHINGTON NEWS

members of the union within the union itself," and also the data is not relevant to collective bargaining on pay minimums.

Ships:

U. S., private line plan \$300 million program.

Orders for the first ships in a \$300 million merchant vessel construction program involving the government and private shipping are to be placed next year.

Moore-McCormack Lines, Inc., and the Federal Maritime Board have worked out a plan whereby two large cargo-passenger liners and 31 new cargo ships will be built for the firm. Construction is to be spread over a period of some 14 years and is expected to provide nearly 27,000 man-years of work in domestic shipyards.

Cost of the two liners, to be built by the Ingalls Shipbuilding Corp., Pascagoula, Miss., will total \$49 million. The government will provide about 40 pct of the money as a differential between the cost of building the ships in this country and abroad.

In addition, a 20-year, operating-differential subsidy contract agreed to by the government and Moore-McCormack will permit operation of the liners as replacements for two older vessels now used on runs between the U.S. East Coast and South America.

Test A-Bomb Storage

Safety in the handling and storage of nuclear devices will be tested at the government test site in Nevada beginning about Nov. 1.

Weapons with a low explosive force will be detonated, the Atomic Energy Commission says. This disclosure appears to confirm unofficial forecasts that the AEC will experiment with small atomic warheads for tactical use, such as artillery shells.

The new series of tests is the first since the AEC set off some 14 shots in Nevada last spring.



feel like a King

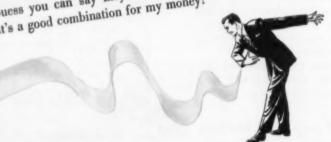
When I do Business with Lamson & Sessions!"

"Maybe I'm not one of Lamson's biggest customers. In fact I'm sure my business is "small potatoes" compared

But small as it is I get a full measure of the "velvet carpet" treatment whenever I call upon them-either to place with some. an order or just ask for some help on a fastener problem.

Come to think of it that's probably why Lamson pops into my mind first when I need bolts and nuts. With the rush of business nowadays it makes you feel good all over to do business with a company with a heart."

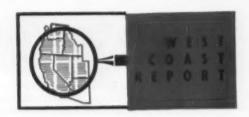
Guess you can say they mix business with pleasure. That's a good combination for my money!"



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Computers Loom Large in Electronics:

West electronics industry sees \$1 billion annual sales for its computers... It's a big market for parts and assemblies... Industry is now centered in California... Non-destructive testing—By R. R. Kay.

◆ WEST COAST electronics manufacturers see a mighty future for their computers. \$1 billion in annual sales is what they expect by 1960.

How big a jump is this? Well, this year, the industry here looks to hit that mark for its entire range of activity: radio-TV, radar, components, research and development, guided missiles—and computers.

An Iron Age survey of western computer manufacturers, centered in California, shows they now make one-third of the nation's computer and data-processing equipment. Their prospects are rosy indeed. Aircraft, missile, and ordnance industries offer them big markets. And there's the highest engineering population per capita of any U. S. area, plus a highly-trained labor force.

One a Week . . . Increased computer production won't mean too much of a hike in the gross tonnage of metal needed. But it will give a big boost to parts manufacturers, relatively small-sized now.

Since 1947, the electronics industry has sprouted one West Coast company per week. These firms will find their business growing by leaps and bounds.

Companies making resistors, condensers, tubes, plug-in units, and special wiring are some that stand to do very well. Today an estimated 35 pct of the southern California computer manufacturer's dollar goes to buy sub-contracted parts and assemblies.

Some Problems . . . Computer industry's rate of growth will depend pretty much on how well the manufacturers meet these problems: reducing size and cost of

equipment; simplifying it; educating potential users to its advantages. Shipping costs to markets east of the Rockies are of little concern—some units sell for \$150,000 and up.

West Coast business and industry applications are increasing day by day, with successful uses in engineering, production, warehousing, sales, and management: for design engineering, computing, production and inventory control, sales analysis, and payroll calculating.

And ideas for new uses of computers and data-processing equipment come up constantly, promise lots of business for the makers. Two developments here: (1) magnetic tape-controlled milling machine for the aircraft industry (see THE IRON AGE, West Coast Report, Apr. 7, 1955) and (2) computers putting to use mathematical formulas to help steel mill production

planning (see THE IRON AGE, West Coast Report, Apr. 28, 1955).

"When the industry hits its real stride, an automatic computer almost certainly will become as standard a piece of equipment in business and industry as the typewriter. and as common in factories as a milling machine," says James R. Bradburn, president, ElectroData Corp., Pasadena, Calif.

Testing Progress . . . Here's progress in non-destructive testing.

Immersed ultrasonic inspection—first detailed in The Iron Age, Aug. 4, 1949, p. 83—is now in the fully automatic stage. It's in use searching for flaws inside aluminum alloy plate—will also work on forgings and heavy extrusions.

Newly developed equipment inspects aluminum slabs up to 48 ft long, 10 ft wide, 20 in. thick. Material is set up in a 50-ft-long tank with a 22½-in. depth of water. A scanning device passes over the material. When it finds a flaw, such as a crack or rolled-in oxide, it automatically marks it up and signals an operator. Warpage or bowing in the test material won't throw the device off.

ElectroCircuits, Inc., Pasadena, Calif., developed and built the equipment for Kaiser Aluminum & Chemical Corp.'s Trentwood, Wash., mill. Installed cost: \$130,000.

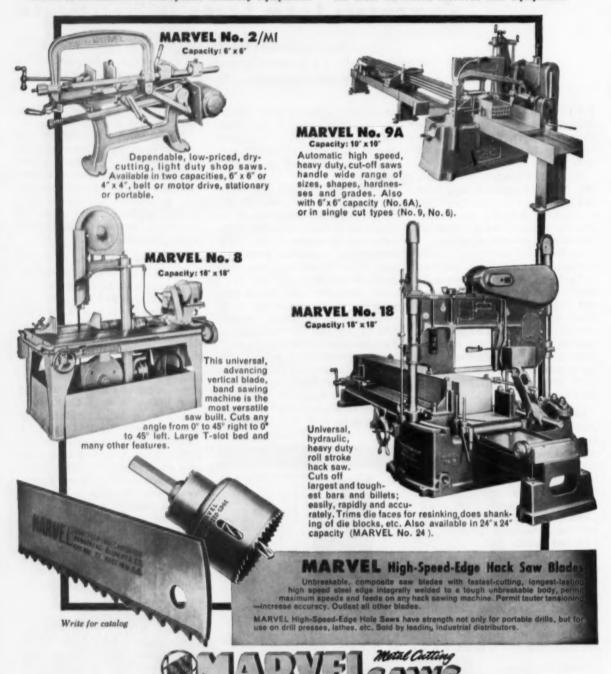
Buys Mines... U. S. Steel Corp. bought big coking coal mines in Colorado. Mines are on 5300 acres of fee-and-lease land under option to Columbia-Geneva Steel Div. of U. S. Steel. There's an estimated 25 million to 50 million tons of high volatile coking coal in two mines bought from Minerals Development Corp., Salt Lake City.



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Are Screw Machine Products Lagging?

Machine builder says products industry takes growing share of output... Cites demand for bigger, better models as evidence of progress and health... Deny competition gains—By E. J. Egan, Jr.

• RECENT sales and current inquiries for his firm's automatic bar machines indicate a bright future outlook for the screw machine products industry. That's the opinion of F. H. Chapin, president and board chairman of The National Acme Co., Cleveland.

Mr. Chapin disputes the idea that injection molded plastics and other competitive processes pose an extremely serious threat to screw machine operators. Such a warning was sounded at a recent national sales conference of the National Screw Machine Products Assn. (The Iron Age, Aug. 18, 1955, p. 62).

In the past two years the products industry has taken an increasing share of National Acme's total bar machine output. And current inquiries indicate to the firm's management that this trend will continue.

Want More Spindles . . . Demand in the multiple spindle field now is for six or eight-spindle models to replace four and five-spindle machines. Customers also want equipment that will handle bars of larger diameter, according to Mr. Chapin.

The Cleveland firm is matching these basic demands—and then some. It's developing new spindle stopping mechanisms, new pickoff attachments, and new methods for loading and unloading workpieces quickly and easily.

From this healthy activity, Mr. Chapin judges that "an industry that is being hurt certainly does not order larger quantities of machines representing a big capital investment."

See New Approach... He points out that the "back-alley" screw machine shop with its helter-skelter business methods is fast disappearing. Instead, operators now have an awareness of overhead and burden costs, watch these elements closely through sound bookkeeping methods.

"As stable businesses," Mr. Chapin says, "the screw machine operators have been capturing more and more markets which previously belonged to other methods of production." And he adds that many jobs that once required second operations are now being completed on a single machine setup at significantly lower cost.

For Example . . . To illustrate, Mr. Chapin displays a part that formerly cost 67 cents to make. The job was switched to an eightspindle machine, another opera-

tion was added, and the tooling was changed.

Result: Cost of the part dropped

Result: Cost of the part dropped to 37 cents. Important thing is that since the same profit margin applies to both cost levels, both the producer and the customer benefit from the changeover.

Mr. Chapin also recalls a little history to bolster his belief that the screw machine products industry will keep growing. Citing the warnings that accompanied the discovery that an upsetting process could make screws from coils of wire, he says the industry just went and found other large and profitable markets.

In the same vein, Mr. Chapin points out that competitive processes haven't always forced the screw machine operators to look for new fields to conquer. In many cases, fantastic claims for rival production methods never did materialize.

Share First Prize . . . Dr. Max Kronenberg, consulting engineer from Cincinnati; and Paul Maker and Edward Dix, senior research engineer and project and design engineer with the Bryant Chucking Grinder Co., Springfield, Vt., shared the \$3,000 first prize in a recent Machine Tool Design Award Program.

The program, which offered a total of \$12,000 in prize money, was sponsored by The James F. Lincoln Arc Welding Foundation.

The paper authored by the prize-winning trio described vibration and rigidity studies made in connection with the design of a new internal grinding machine of welded steel construction.



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THE IRON AGE



The Iron Age

Jerome H. Stanek A leader in the contract tool and die industry at 40, he has
the experience to deal realistically with current problems but he is young
enough to have a keen interest in the future.

Jerome H. Stanek takes his responsibilities seriously but not himself. The youthful (40 years) president of National Tool & Die Manufacturers Assn. is all business when running a meeting. He thinks "the future of the contract tool and die industry is terrific" and there's no nonsense when he's working for that future. The job comes first.

But when he steps down from the presiding platform, Jerry breaks out in a boyish grin, is ready to exchange talk on his Milwaukee Braves or the trout fishing. This quick switch points up a combination of qualities that have made him such a fine leader for NTDMA. He is young and imaginative enough to be conscious of future needs. "... greater specialization will be required because tool and die making ... must meet the changing moods of the customer."

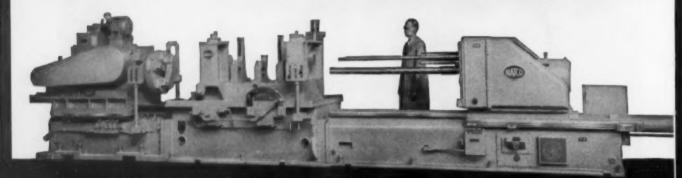
He is young but he has a solid background in his industry. His talk is realistic and practical. "The tool and die shop has to remain constantly on its toes," he says and he speaks as one who has been a part of the tool and die world all his life. He got an early start and has stayed close to the thing ever since.

His father founded the Stanek Tool and Manufacturing Co. of Milwaukee when Jerry was 9 years old. The firm started as a jig, fixture and stamping die shop, entered the field of die casting dies in 1934. In 1937, Mr. Stanek died and Arthur J. Seeger became president of the firm. Jerry joined the Stanek company in 1939, three years after he received a mechanical engineering degree from the University of Wisconsin. He is now vice president and general manager. One brother, Ed, is purchasing agent; another is serving his apprenticeship.

Jerry is an active civic worker. He was treasurer and vice president of the Milwaukee Junior Chamber of Commerce 1945-46; president of the Milwaukee Tool Center of NTDMA 1946-47; and chairman of ASME's junior chapter in Milwaukee. He has taken a big part in apprenticeship work, has two daughters, Margaret and Elizabeth, does a lot of traveling.

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The Iron Age INTRODUCES

DuBose Avery, elected manager, architectural sales, E. M. Strauss, Jr., manager, Commercial Research Div., Aluminum Company of America, Pittsburgh.

J. J. I. Jamieson, appointed assistant general manager of sales, Steel and Tubes Div., Republic Steel Corp., Cleveland.

J. W. Elliott, elected vice-president, Brubaker Tool Corp., Millersburg, Pa.

Frederick C. Arnold, appointed welding sales manager, Pacific Coast; Donald W. Davis, mid-western regional manager; Carlisle P. Myers, appointed general counsel; Leonard E. Kust, elected general tax counsel, Westinghouse Electric Corp., Pittsburgh.

G. S. Corigliano, appointed manager, advertising and sales-promotion, Bart-Messing Corp., Belleville, N. J.

Merle Nobel, appointed supervisor, Cincinnati area, Luria Brothers & Co., Inc., Cincinnati, Ohio.

Charles C. Snider, named field sales manager, Consolidated Engineering Corp., Pasadena, Calif. Wesley R. Sutton, named assistant chief engineer, Carbide Sales Div., Firth Sterling, Inc., Pittsburgh.

Walter E. Streeter, named assistant plant manager, Kaiser Aluminum & Chemical Corp., Erie, Pa.

Daniel J. Sheehan, named general parts and service manager, Hyster Co., Portland; James L. Woodley, appointed manager, Hyster manufacturing plant, Danville, Ill.

C. R. Terpening, named sales manager, Rimat Gage Co., Pasadena, Calif.

Thomas F. Mackey, named manager, Systems Sales Section, General Electric Co., New York; E. J. Weller, appointed manager of tool sales, Carboloy Dept., Detroit.

F. C. Weyburne, named general manager, Skinner Div., Bendix Aviation Corp., Troy, N. Y.

R. C. LiBeau, appointed plant manager, Anderson Brass Works, Birmingham.

Harold W. Gilberg, elected assistant superintendent, Safety and Welfare Dept., Jones & Laughlin Steel Corp., Pittsburgh.



ALBERT L. KNAPP, appointed vicepresident and manager, Machine Tool Div., Pratt & Whitney Co., Inc., West Hartford, Conn.



JACOB J. JAEGER, named vicepresident and chief engineer, machine Tool Div., Pratt & Whitney Co., Inc., West Hartford, Conn.



GEORGE J. HEIDEMAN, elected treasurer, Kennametal Inc., Latrobe, Pa.



October 20, 1955



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CITY	IONS STATE

A. A. Piper, appointed consultant, Chicago area, The Electric Controller & Manufacturing Co., Cleveland.

U. E. McCarty, appointed district sales manager, Delta Power Tool Div., Rockwell Manufacturing Co., Pittsburgh; John M. Bannon, Jr., named district sales manager.

Allen W. Salzman, appointed chief engineer, Waukesha Tool Co., Waukesha, Wis.

John E. Sandberg, sales manager, The Shenango Steel Co., Sharpsville, Pa.; William E. Kennedy, appointed assistant sales manager.

R. T. Samuel, appointed regional sales manager, accounting machine div., International Business Machine Corp., New York.

Donald L. Roach, appointed western states district manager, Monarch Rubber Co., Hartsville, Ohio.

Anthony J. Derrick, appointed manager, Kennedy-Van Saun Foundry Dept., Kennedy-Van Saun Mfg. & Eng. Corp., Danville, Pa.

Shaochi Huang and L. F. Spencer, named research metallurgists, Allis-Chalmers Manufacturing Co., Milwaukee.

Ralph Hanna, appointed sales and service engineer, Chicago Territory, Ferro Corp., Cleveland.

Stanley Johns, named district sales manager, J. B. Ford Div., Wyandotte Chemicals Corp., St. Louis office; George C. Prziborowski, joined industrial sales staff, San Francisco.



ROBERT T. CONROY, appointed assistant to the president, The Morgan Engineering Co., Alliance, Okio.



ROBERT E. SCHROEDER, appointed manager, Cleveland district office, Luria Brothers & Co., Inc., Cleveland.



ROBERT A. EMMETT, Jr., elected vice-president, Detrex Corp., Detreit



WILLIAM C. RUSSELL, appointed general manager, St. Louis Div., Joy Manufacturing Co., Pittsburgh.

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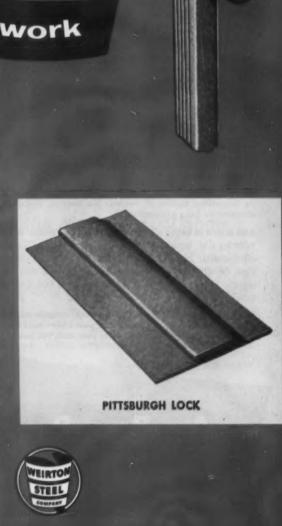
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Donald P. Carnes, named chief geologist, Tennessee Coal & Iron Div., U. S. Steel Corp., Birmingham.

Arthur J. Bukovich, appointed district manager, Industrial Div., Harnischfeger Corp., Boston; other district managers are: Paul Anderson, Jr., Buffalo; Sidney S. Keywood, Birmingham; Richard P. Schell, Pittsburgh; Stuart W. Trainer, Detroit; Wayne H. Green, Dallas; Henry F. Sulkowski, named sales engineer, Minneapolis.

Robert M. Van Tassel, appointed head industrial designer, Joy Manufacturing Co., Pittsburgh.

Joseph H. Rinehart, Jr., appointed sales engineer, Cutting Tool and Gage Div., Pratt & Whitney Co., Inc., Springfield, Ohio, and Charles G. McParland, named cutting tool engineer, West Coast area, Los Angeles.

Edward W. Carter, elected board of directors, Northrop Aircraft, Inc., Hawthorne, Calif.

Lawrence J. Woods, Jr., named engineer, Wire Machinery Div., Morgan Construction Co., Worcester, Mass.

OBITUARIES

George Skakel, Sr., chairman, board of directors, Great Lakes Carbon Corp., New York.

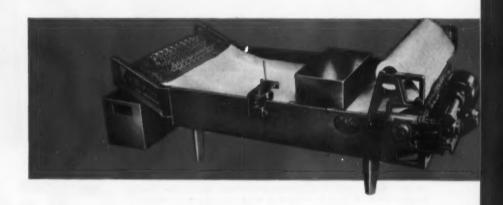
Adolph W. Machlet, chairman of the board, American Gas Furnace Co., Elizabeth, N. J.

Lincoln Kilbourne, 44, general manager of sales, Industrial Div., Jeffrey Mfg. Co., Columbus, O.

George T. Kearns, 54, secretarytreasurer and director, Kennametal Inc., Latrobe, Pa.

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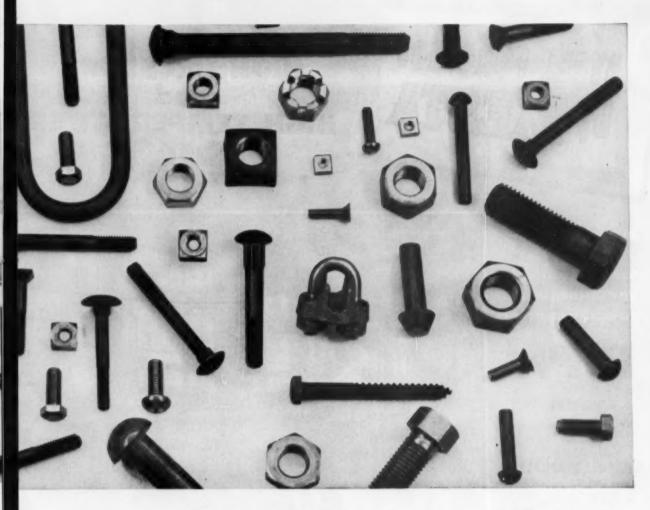
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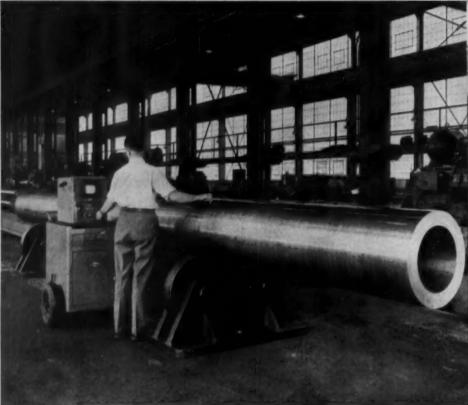
October 20, 1955

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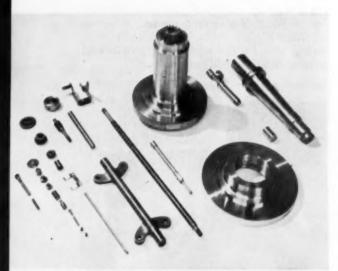


Records help-

Heat Treat Controls Boost Job Shop Quality

By W. G. PATTON, Engineering Editor

• If you're looking for a better, more efficient way to control your heat treat operations, you'll be interested in the system used by Bosworth Steel Treating Co. . . A broad range of work is handled but the "system" keeps production and quality at high levels . . . Controls steps to better quality are described in this article.



WIDE RANGE of parts handled in the plant include transmission gear, tank spindle, rivets and powdered metal parts. The largest part weighs 50 lb, the smallest only a few ounces.

◆ IN AN AGE of increasing specialization of equipment, the 14-man commercial heat treat plant of Bosworth Steel Treating Co., Detroit, concentrates on getting a greater variety of work out of its standard equipment. The firm handles a wide range of work, including aircraft specialties and small, volume production parts. A unique system of records and controls is an important factor contributing to the high quality of the work.

The first thing that strikes a visitor to the 6000 sq ft plant of the Bosworth Steel Treating Co., Detroit, is the well-planned layout and the absence of specialized equipment to do special heat treating jobs. Although the company specializes in precision heat treat operations, including carbon restoration, and handles a number of highly stressed aircraft parts and high carbon jobs, there are no specialized furnaces.



LOADING the vestibule of a Dow isothermal furnace to which special agitators have been added.

As a matter of fact, each of the 9 furnaces now operating is a standard heat treating furnace. Standard indicating and recording controls are used. Each furnace burns natural gas and uses radiant tube heating. Practically any furnace in the line is used from time to time for cyaniding, hardening, annealing, martempering, carburizing, carbo-nitriding, or carbon restoration.

Close control improves quality

By controlling closely the furnace atmosphere and furnace temperature through all stages of the heat treat operation, customers' specifications can be met for all normal heating and cooling cycles, it is claimed.

In order to meet the expanding range of re-

quirements of its customers, Bosworth Steel Treating Co. has had Dow Furnace Co. equip its heat treat furnaces with several special features. For example, several of the furnaces are equipped with a vestibule that makes possible heating and quenching of parts under complete atmosphere control. In addition to two sealed quench tanks, special agitators have been added. This arrangement permits the use of controlled, variable quench agitation where this is desirable or necessary and constitutes what the company calls "a third dimension in heat treat operations" for developing and controlling physical properties of heat treated parts.

System gives permanent record

A unique feature of the Bosworth operation is the unusually complete system of records that are kept not only to insure a proper sequence of operations but to give a permanent record of all heat treat operations performed on a given part. The use of card records showing temperatures, time at temperature, and complete atmosphere analysis and quenching cycle, enables the company to reproduce, at any time, any heat treatment cycle that has been proved satisfactory for a given part.

For all incoming material a work ticket is made out containing information taken directly from the customer's shipper as well as from shop files. This form shows the part number, number of pieces, weight, type of steel, heat treat specifications, number of containers, etc.

Most of the information shown on the work ticket describing heat treat details is taken from company control card records and usually comes as a result of a conference involving the production metallurgist, quality control man and the salesman responsible for the job.

For various heat treat operations different colored cards. A pink card is used for hardening; blue is used for carburizing and a white card is used for cyaniding. This permits easy recognition and avoids costly mixups.



QUENCHING fixtures are developed to increase handling efficiency and promote uniform results.



SHIM STOCK is used in controlled carburizing for testing the amount of carbon addition.

Quality Control Histogram Chart

Part Name	Part No. Spec. Rc 30-34 Date 6-8-55
	Shipper 20649 S.O. B-17049
	S.O. for complete INFO.
Remarks Draw 2	

ROCKWELL"C"			-	-		10 miles	-	-		1	E	SE	N)=	=	B	A	ck	<	- 7 B	-	7	OP	4	4 Y	ER	-R	EF	1R	1
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HARDNESS checks recorded on histograms of this type are a helpful aid in maintaining high product quality.

No work can be heat treated unless it is accompanied by a shop order showing precisely what is to be done. When the job is completed, a record has been accumulated showing every step in processing, including temperature, time at temperature, furnace atmosphere analysis and additions, if any, and other details.

After heat treat procedures are determined, shop orders for a 24-hr period are arranged for release to take maximum advantage of furnace potential, atmosphere etc.

As work is being processed, another record is accumulated by furnaces. This record is maintained for each furnace and constitutes a complete log of operations. The record shows the name of the customer, describes the part, and gives shop order number, time loaded, time up to heat, time pulled, atmosphere, inspection results and other important items.

This work record by furnaces is analyzed periodically by the quality control supervisor. Anything which disrupts a proper heat treat procedure or upsets an established pattern of results can be quickly detected—and corrected.

When processing is completed, the shop order is returned to the shipping department. Here

the work is given a final inspection by the quality control supervisor. During final inspection, parts are tested throughout the load to insure uniform results.

Data from most jobs are recorded on histograms. These simple, easy-to-make charts are used in many different ways: to indicate operating patterns or to study variables and constants. Histograms may also be employed to compare the results of one furnace with another.

Graphic record kept

Much valuable knowledge has been gained from histogram records. The histogram supplies a graphic record of what is taking place in the furnace, in the quench or in the draw. They also accurately reflect relative efficiency, employee training, experience, attitudes of operators and supervision. Bosworth considers histograms "a surprising efficient record of where we've been, where we are, and where we're going" in heat treatment.

Histograms are not confined, of course, to simple data like hardness explorations although

"To avoid straightening, heating and quenching rates are carefully selected and closely controlled . . . Metallurgists make final decisions about atmospheres, temperatures and time at temperature."

hardness checks are often helpful as a means of checking quality. It is often important to have a reliable record of the straightness of the part. A consistent, compact pattern is indicative of tight process control, otherwise readings would tend to scatter over a much wider area.

According to Howard Bosworth, owner of the company, some unexpected help has come from the use of histogram records. Any looseness in operating methods is almost certain to show up in a histogram record, he says.

The company has developed its own quenching fixtures not only to increase efficiency in handling but to promote uniform results. Uniformity of the quench, hardness and straightness are checked periodically.

Use two control methods

Close atmosphere control is essential if desired results are to be obtained in job shop operations. The firm utilizes both gas analysis and dew point control methods, depending on the application.

Utilizing its facilities for close atmosphere control it is possible to handle (1) low carbon carburizing, (2) decarburization of high carbon steel in any of the furnaces now operating.

Bosworth has specialized in carbon restoration. Several years ago, the company was asked to bring up the carbon level of some automotive parts from 0.12 to 0.37 C. The wrong steel was originally ordered for the job. When it was learned 1137 steel was not available, it was decided to use the low C steel and resort to carbon restoration. The move not only saved money on finished parts that would have to be scrapped but also eliminated what might have been a serious production delay.

Unusually versatile operating procedures and controls have been developed through the years largely as a result of the firm's broad range of services to customers. In addition to many small but critical automotive production parts, Bosworth regularly handles work for the aircraft and for national defense.

Critical part pre-tests self

A critical part now being hardened by Bosworth is a special aircraft rivet. These particular rivets are cold headed from SAE 4037 coils. Threads are rolled. A lock groove must be held to close tolerances since, in practice, a gun grips the thread on the blind rivet, then swages the collar in place. Experience has shown that if carbon content is too high, rivet heads will merely pop off. In effect, each of these blind rivets pre-tests itself. Consequently, it is essential to hold hardenability and carbon content within very close limits.

To avoid straightening, heating and quenching rates are carefully selected and closely controlled. Experienced metallurgists always make the final decisions about atmospheres, temperatures and time-at-temperature. Operators follow this procedure carefully and a written record

is kept of each operating step.

While close carbon control is an important requirement, the operator is always aware of the rate of progress in the furnace. This is accomplished by shim stock control testing. By weighing the shim stock, the operator can determine quickly and easily the gain in weight which, under controlled carburizing conditions, will consist almost entirely of the carbon addition. Thickness of the test strips is about 0.008-

Bosworth makes frequent use of isothermal treatments to avoid the risk of cracking or subsequent straightening. Frequently, a quenching temperature just above the Ms point is employed to eliminate a subsequent straightening opera-

Oil baths filtered

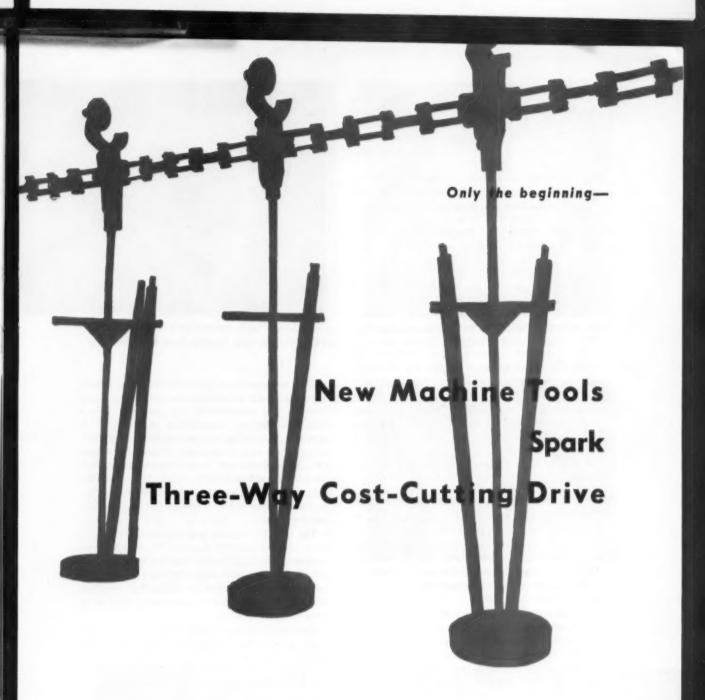
Use of sealed oil baths tends to prevent loss by oxidation. Del Park filters, which can be moved as desired, are employed to eliminate solid particles in the oil.

Agitators, used during quenching to increase the velocity of the quench, tend to improve uniformity.

Quenching oil is stored in several 1500 gal tanks. A propeller, operating at 4000 gpm, draws the oil down through the middle of the load to insure maximum cooling effect. The amount of agitation can be varied, depending on the volume of parts, cross-section of the part, possibility of distortion during quenching, etc.

Despite the unusual range of parts heat treated, the Bosworth Steel Treating Co. is able to handle, regularly, about 20 to 30 tons of work each working day. Handling of work is facilitated by the use of roller conveyors and location of furnace doors at the most convenient working

The company is now installing degreasing equipment for cleaning critical jobs and providing a desired bright finish for many types of work. Bosworth is also installing a new continuous-type heat treating furnace containing many of the versatility features developed in batch type operations.



- * Better machining practice is one road to unit cost reduction . . . But how about better parts handling methods? . . . And why not see what some modern metallurgy can do to improve part quality, even with less expensive materials?
- Chrysler Corp. used this three-part formula to get better passenger car axles at greatly reduced cost... It involved a combination of new materials, new machines and better material handling techniques to do a thorough job.
- ♦ TO REDUCE UNIT costs and increase production of machined metal parts, most manufacturers will install new equipment or devise more efficient tooling setups. Having done this successfully, many firms will call it a day. Other companies may go a step further and try to gain additional savings from improved part-handling methods. And some will investigate still a third area to see if less expensive metals can be substituted, and by some metallurgical magic be converted to better quality products than before.

This type of sustained drive to cut costs, increase production and improve product quality has paid off at Chrysler's Lynch Road axle plant. The overall program started with the purchase of five six-spindle Acme-Gridley automatics to speed the machining of passenger car axle shafts. The new equipment replaced single-purpose tool units that worked on only one end of a shaft at a time, thereby requiring much handling of individual shafts.

The five automatics not only carry six shafts apiece through a full machining cycle, but also perform simultaneous operations on both shaft ends. By mounting 17 tools on each of the machines, the cycle for a single shaft s only 18 seconds. Thus, the theoretical output from any of the five automatics is 200 shafts per hour—1000 per hour from the group. Net result is much greater production per square foot of machining area floor space.

Having achieved these savings in the machining category, the engineers did not consider that their assigned cost-reduction job was satisfactorily completed. Instead, they continued to search for additional ways to improve efficiency.

Materials handling proved to be a fruitful area. Overhead trolley-and-chain-link conveyors were routed for most efficient handling of axle shafts to and from the machining, heat treating and other processing sections. Thus, significant savings were added to those already gained by the switch to multiple-spindle automatic machining.

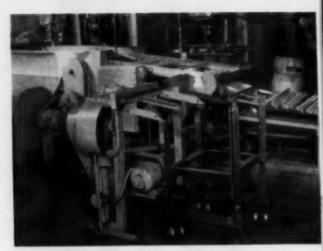
Metallurgists attack material cost

Meanwhile, Chrysler metallurgists were hard at work to find a substitute material for axle shafts that would somehow be less expensive but still produce better axles than the alloy grade then in use. This was the third avenue of attack on the problem of reducing overall costs for these mass-manufactured items.

The metallurgists determined, through extensive research and testing, that plain carbon steel axles might fill the bill. Test pieces that had been induction case-hardened actually indicated better service performance than the conventional alloy types that had been through-hardened by a complete furnace treatment. In addition, the new plain carbon axles indicated a considerable saving in the straightening and annealing costs associated with production of the alloy variety.

Based on these findings and predictions, a pilot line was set up to make plain carbon steel shafts and induction harden them. These experimental pieces were tested exhaustively in taxicabs and trucks. Results of the field test program completely confirmed the earlier laboratory findings.

The next step was to order full production of carbon steel axles from the forging vendors in place of the former alloy grade. Coincidentally, the Lynch Road plant was equipped to induction harden these workpieces on a volume basis. This fast induction heating setup cut $3\frac{1}{2}$ hours from the cycling time that had formerly been required for through-hardening of the alloy steel shafts.



"SELECTOR" unit automatically checks and separates straight axle forgings from bent ones.

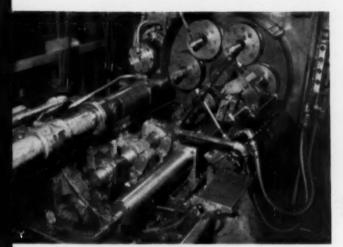
But as sometimes happens when a radical change is made in material specifications, a new problem was encountered. As predicted, it was observed that the plain carbon steel shafts required no annealing and less straightening after hot forging and air cooling. It was also noted that those which had to be straightened before machining tended to warp excessively during the induction hardening stage, thus boosting the expense and time involved in the final straightening process.

The solution was to help the vendors modify their forging practice to produce a higher proportion of initially straight shafts. This was successful for the most part, although it was still necessary to see that the few shafts that were not straight did not reach the automatic machining area.

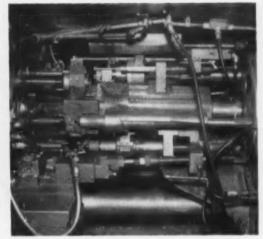
This problem was turned over to the Lynch Road plant's tool engineers. They not only solved it, but cut processing costs still more in so doing. They developed a so-called "selector" which automatically separates the non-machinable bent shafts from the acceptably straight ones.

The device is loaded with a batch of forged shafts and automatically feeds and rolls them over a series of five metal contacts. The unit works on the principle that an axle which is bent at one or more of the five check points will depress the metal contact at that point. When this occurs, a switch is actuated that diverts the bent shaft for a special straightening treatment that minimizes the tendency for the shaft to warp in the hardening process. Straight pieces pass directly through for transfer to the machining section and the six-spindle automatics.

The "selector" eliminates the need for the manual handling formerly required to do a 100-pct inspection of axle forgings received from vendors. This was a time-consuming job, fur-



AXLE shaft forgings are set up in 6-spindle automatics so that as splined ends are machined by one



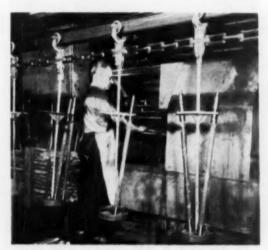
set of tools (left) another set simultaneously works on the tapered ends (right).

ther complicated by the more frequent straightening that was required when alloy shafts were used.

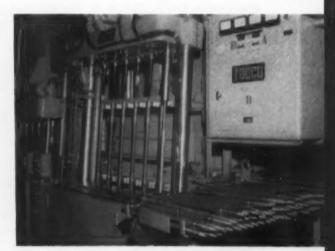
The benefits resulting from this plant's broad approach to cost reduction include: (1) reduction of straightening expense by 70 to 80 pct; (2) straightness check by machine instead of 100 pct manually; (3) lower cost carbon steel used for axles; (4) elimination of unnecessary part-handling operations; (5) cycle time cut a total of 7½ hours by eliminating former furnace hardening and annealing practices; (6) increased production per square foot of floor space; (7) improved axle quality; (8) reduced unit cost; and (9) reduced investment per unit capacity of the efficient production setup.



REAR of one of five 6-spindle automatics that machine both ends of a shaft in 18 seconds.



CONVEYOR carries machined shafts away from the operator's loading and unloading station.



INDUCTION hardening setup for plain carbon steel shafts saved 31/2 hours of cycle time.

Ultrasonic Unit Makes Fast, Accurate Weld Tests

- A definite contribution to the growing interest in field welding of structural steel is the ease and accuracy with which such construction can be tested.
- · Ultrasonic testing has just been used for the first time in Canada to field test welds in a 15-story building . . . A portable unit spots porosity, slag inclusions and cracks . . . It gives immediate results and subconsciously induces greater care in welding.
- ◆ ULTRASONIC TESTING of a welded structural steel framework has been used for the first time in Canada, on a 15-story addition to the Toronto General Hospital. This method of non-destructive testing checks quality of field butt welds between beams and columns; potential danger due to such possible hidden faults as undue porosity, slag inclusions and especially hidden cracks is eliminated.

Months of research and experiment preceded use of ultrasonic testing in the field, the final method being evolved by Canadian Inspection and Testing Co., a division of The Warnock Hersey Co., in collaboration with the consulting engineers, Wallace Carruthers and Associates; the architects, Mathers and Haldenby; and the fabricators and erectors, Dominion Bridge Co.

A phototype of a typical fixed-end connection was fabricated by Dominion Bridge and all practical non-destructive methods tried out in its shops. On this prototype, three welds were prepared-one having considerable porosity, another one with slag inclusions and a third with various cracks. These welds were x-rayed and their faults noted. They were then tested by an ultrasonic unit and the results were compared with the x-ray pictures. The machine was able to distinguish the difference between the various conditions to the satisfaction of the consultants.

Because of the thickness of metal to be examined and the need to make tests in the



ULTRASONIC TEST UNIT is portable, quickly spots porosity, cracks and inclusions.

field, ordinary shop x-ray equipment was ruled out because of its bulk and weight, and much experimental work was devoted to the use of radioactive sources such as cobalt-60 and iridium-192. Though these methods had certain advantages, the shop tests showed that the ultrasonic method gave the best results for this

Ultrasonic testing is a peacetime application of the wartime electronic weapon, sonar. By means of a crystal, a sound pulse of extremely high frequency is sent into the weld metal. The sound is reflected from rear surfaces and is received by a crystal. It is also reflected

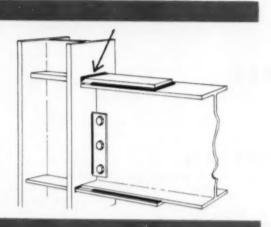


FIG. I—TENSION BUTT WELD (arrow) which was tested by the ultrasonic method.

from internal defects, however small, which show up on the face of a cathode ray tube, in the form of "blips." A skilled operator can not only "see" internal defects but can also distinguish between porosity, slag inclusions, cracks, etc., and determine the depth of such defects from the surface.

The ultrasonic unit (see photo) manufactured by Kelvin-Hughes of England is easily carried by one man and operates on power generated by a portable gasoline-driven unit. Auxiliary equipment includes a portable grinding wheel, which is used to prepare the surface of the weld for testing.

The sketch (Fig. 1) shows a typical connection. The column incorporates a vertical plate

which is used for erection bolting and a "holding" plate. Both these items are prefabricated at the shops. At the site, a beam is put in place on the bottom plate and erection bolted in place. Following this, a top plate is welded both to the main column and to the top of the beam. The tension butt welds joining these plates to the columns were the ones which were tested by the ultrasonic method.

The test procedure is simple. The surface of the adjacent metal upon which the probes of the ultrasonic unit are to be placed is ground smooth. Next, all surfaces along which the probes will travel are coated with heavy oil. This is essential to provide a contact through which the sonic waves will be transmitted into the metal. The echo technique is then applied using 20° angle probes-the latter positioned to reflect from the under surface of the plate into the weld metal, as shown in Fig. 2. The sound waves spread out in a conical beam with a radiation of 16°. This has the effect of saturating the weld with sonic waves. The angle of the transmitter and receiving crystal are both adjusted according to the thickness of the plate being tested.

The principal advantage of the ultrasonic method over use of gamma rays or other form of x-rays is that any faults are immediately detected as soon as the weld is tested. It eliminates waiting for development of plates so that the testing procedure can follow immediately on the heels of the welders. As to quality, improvement results from two factors: First, faulty welds are immediately detected so they can be cut out and replaced. Secondly, there is a psychological advantage in that the welders—knowing that their work is going to be rigidly inspected—subconsciously take greater care in their procedure.

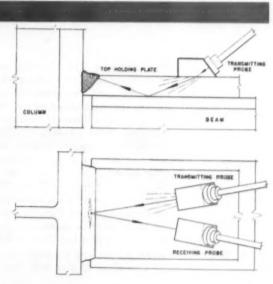


FIG. 2 — ECHO TECH-NIQUE bounces pulse from underside of plate into weld and back to probe.

Arc Cutting Process Simplifies Nonferrous Fabrication

- * Arc cutting by a new process not only produces edges of saw-like quality on nonferrous materials, but does it at exceptionally high speeds . . . For example, 1-in. thick aluminum can be cut at 50 ipm; 1/4-in. material at 300 ipm.
- ◆ The process uses the concentrated energy of a high-temperature, high-velocity arc, shielded by an argon-hydrogen mixture . . . The arc is maintained between a tungsten electrode and the workpiece . . . Straight lines, bevels, circles or odd shapes can be cut with equal ease.
- CUTTING of nonferrous metals by the use of a gas-shielded arc may change fabrication techniques. The new method, called Heliarc cutting, permits nonferrous metals to be cut and shaped quickly and easily. The cuts are of saw-like quality and the high cutting speeds attainable with the process sharply reduce processing costs.

The process, developed by the Linde Air Products Co., employs a constricted arc of extremely high temperature and high velocity between a tungsten electrode and the nonferrous workpiece. This concentrated energy of the arc stream melts and ejects a thin section of metal. The jet-like action of the arc stream is mechanical. Gas shielding of the cutting zone protects the cut face from oxidation.

ting nonferrous metals comparable to oxyacety-

Heretofore, there has been no process for cut-



STRAIGHT LINES, circles, bevels and shapes can be cut with equal ease. This 1/2-in. thick aluminum circle was cut at speed of 60 ipm.

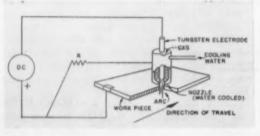


DIAGRAM shows scheme of operation of Heliarc cutting process. Note constricted arc.

lene cutting of steel. Usually, saws and planers have been used for making straightline cuts. Contoured cuts were generally made on a bandsaw or by hand-chipping or drilling methods.

All the advantages of oxyacetylene cutting of steel are now brought to a metal such as aluminum. For example, \(\frac{1}{4}\)-in. thick aluminum can be cut at 300 ipm using a mechanized setup. Cutting speed is 125 ipm for \(\frac{1}{2}\)-in. thick material; 75 ipm for \(\frac{3}{4}\)-in. plate and 50 ipm for 1-in. material. Slower cutting speeds may be obtained by simply adjusting the controls. Also, the process lends itself to mechanical or manual operation—in any position—for cutting straight lines, bevels, circles and shapes.

Fabrication of aluminum tank cars points up

the advantages of the process quite well. The average cutting speed on \(\frac{5}{6}\)-in. thick plate, using a combination of burning and chipping or drilling and chipping, is about 1 ipm. The average machine planing speed for plate edge preparation, including set-up and handling time, is about 10 ipm. By mechanized Heliarc cutting, speeds for the same plate thickness are approximately 100 ipm.

With few exceptions, the cutting equipment is essentially the same as that used for inert gas-shielded tungsten-arc (Heliarc) welding. A new collet and collet body are used in existing machine and manual welding torches. Tubing for water cooling the torch body is internal. The nozzle itself is a completely different type.

Gas mixture shields arc

Another change is the addition to the control apparatus of a "pilot arc" circuit which is used to initiate the cutting arc. In this circuit, a resistor limits current from the power supply to the nozzle.

The shielding gas differs from that used for welding. The best results obtained thus far have been with a mixture of argon and hydrogen. For machine cutting, a mixture containing 65 pct argon and 35 pct hydrogen has been most satisfactory. The optimum mixture for manual cutting is one with about 80 pct argon and 20 pct hydrogen. In the latter case, the lower hydrogen content provides greater tolerance for variation in the arc length than is required for machine cutting.

In manual cutting operations, pure argon is used to initiate and maintain the pilot arc which precedes the cutting arc. Once the cutting arc starts, hydrogen is automatically added to the flowing argon to provide the required mixture.

Two starting methods used

Two different methods of starting are used with the process. One is for mechanized operations while the other is more suitable for manual cutting. Mechanized cutting requires the use of

AUTOMOTIVE—Trailers, truck bodies

AVIATION—Jigs and fixtures; aircraft components

CHEMICAL—Vessels, separators

ELECTRICAL—Control boxes, equipment covers, busbars

FOOD EQUIPMENT—Containers, separators, piping

HEATING & REFRIGERATION—Refrigerator units, heaters

MACHINERY—Structural and functional members

PETROLEUM—Pressure vessels, refinery equipment

RAILROAD—Tank cars, frames and shells

SHIPBUILDING—Bulkheads, superstructures, keels

STRUCTURAL—Beams and other structural members

a high-frequency unit in conjunction with the pilot circuit for starting the cutting arc. In manual cutting, a pilot arc is used in an argon atmosphere to start the cutting arc.

An important factor in determining the ease of starting and the maximum arc length that can be maintained in the argon-hydrogen mixture is the open-circuit voltage rating of the power equipment. It should be a minimum of 80 v.

Work on other metals

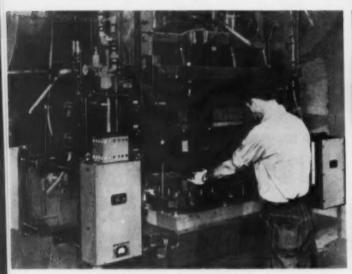
Most of the development work thus far has been done on cutting of aluminum. Although preliminary investigations of cutting techniques for other nonferrous as well as ferrous materials show promise, no definite recommendations can be made as yet.

Present equipment for use with this new process is lightweight and easy to handle. The cutting technique itself is simple, requiring no particular skills.

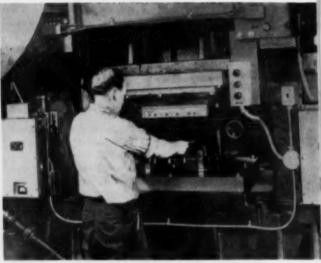
Thickness,	Speed, ipm	Amps	Volts	Gas Flow,
1/4-in.	300	320	70	50
1/2-in.	125	320	75	60
3/4-in.	75	320	77	70
1-in.	50	320	80	70

Gas used is an argon-hydrogen mixture in the proportions 55:35.

Accident prevention-



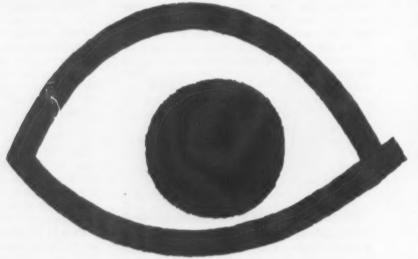
CURTAIN of light 12 in. high protects operator loading material at the front of the press.



SECOND control unit safeguards helper at rear, stops press when light beam is obstructed.

WideArea
"Electric
Eye"
Safeguards
Machine

Operators



- A wide-beam form of the familiar photoelectric cell spreads a "curtain of light" in front of machinery danger zones... When an operator's hand penetrates this light screen, the machine stops instantly.
- The control device is inherently foolproof and "fail-safe" . . . If any part of its electronic circuitry fails, the press or shear stops also . . . Unit helps boost production by allowing the operator freedom of movement.

◆ THE SAFETY OF operators of power presses and similar equipment has been enhanced by an adaptation of the familiar photoelectric cell or "electric eye." This electronic guard uses a so-called "curtain of light" rather than the single narrow beam of the usual photoelectric cell. A hand, or anything that enters the "curtain of light" area, causes the machinery to stop instantly.

The device offers inherently foolproof protection to operators of power presses, shears, and similar machinery equipped with friction clutches or hydraulic drives. Machines so equipped will operate only when the die or shear zone is absolutely clear and the safety device is in perfect working order.

Helps boost production

Second advantage of the photoelectric guard is that it may also be considered as a production tool. Many conventional press guards interfere with maximum production potential of either the machine or the operator or both.

For example, barrier guards that completely enclose the pinch-point make a machine virtually 100 pct safe, but this type of guard must be designed for every die, and it does tend to hamper hand feeding.

Also, "pull-out" guards that literally shackle an operator to a machine are often considered unwise from a psychological point of view. Their maximum effectiveness depends on their cables always being in perfect adjustment.

Another device is a type of two-hand control coupled with an anti-repeat mechanism. This requires the operator to keep his hands out of the working area of the press for a specified period of the press stroke. During this period the operator moves his hands to the two control buttons. Where the buttons are inconveniently located there may be considerable lost time and motion in the act of reaching back and forth between pushbuttons and workpieces.

Aids operator's comfort

The electronic light curtain requires no cooperation or coordination between the operator and his machine. It is completely automatic to the point that the operator need not even be aware of the presence of the device. His hands are completely free at all times so that he can move and work in the fashion that is most natural and comfortable for him. Should be inadvertently reach toward the dies as the ram is descending, the guard will immediately stop the press.

The "curtain of light" guard is manufactured by the Electronic Control Corp., of Detroit. It mounts a projector and a phototube receiver opposite each other in front of the press. The screen of light thus projected may be up to 12 in. high. It has no gaps and is uniformly constant and effective throughout its entire height and width. No mirrors are used to reflect the light beam back and forth.

In practice, whenever the operator's hand or other foreign object obstructs or "breaks" a portion of the light screen, the sensitive phototubes in the receiver instantly detect the light change. To insure that the light change caused by an obstruction is directly related to the original light intensity provided by the device itself, the receiver is shielded against any excess of light impinging on it from outside sources.

Still another safety factor is designed to protect the electronic guard from the effects of line voltage variations in the plant or shop. Circuitry of the unit was devised on a balanced light principle. Any variation in line voltage will cause both the projector light and a built-in "balance light" to vary together so that the line voltage change is cancelled.

Fundamentally, the electronic control guard contains a relay which is normally energized. "Make" contacts of the relay are wired into the stopping circuit of the press. The press will operate normally as long as the relay is energized and the contacts are closed. But when the phototube receiver detects that something has entered the danger zone, the relay drops out, the contacts open and the press stops.

Doesn't hamper feeding

The problem of feeding material through the guarded area while the dies are open, and without causing the machine to stop, is solved by the use of a cam-operated switch. This permits bypassing the control contacts of the relay during the upstroke so that the light curtain guards and controls the press only on the closing stroke.

It should be noted that although the electronic guard will unfailingly act to order full stoppage of the press when someone or something invades the danger zone, it is still the job of the press brake and clutch to stop the ram travel. The screen-of-light device is foolproof and inherently "fail-safe," but it cannot guard against possible brake failure nor a failure by any of the drive linkages to the press ram to respond to a stop signal.

This limitation is not a severely limiting one for the photoelectric cell type of electronic guard. Accident records indicate that the great majority occur due to failure of the human operator of the press or machine, rather than by mechanical failure of the clutch, brake, or other ram-movement mechanisms. Actually the electronic guard eliminates the human element altogether.

By removing all chance for human error, the curtain-of-light control not only protects the machine operator but also safeguards passers-by, helpers, sweepers or anyone else who might accidentally or deliberately get too near the danger zone of a powerful press. By so doing, it helps to remove the psychological stress that everpresent hazards impose on plant workers.

New Super Alloy

Speeds Jet Progress

- ◆ Jetalloy 1570—designed for aircraft gas turbine buckets widens the horizons of the high temperature designers . . . Strictly a "laboratory baby" at the outset, it is now a highly useful alloy with broad applicability.
- Good forgeability and superior fatigue strength at 1500°F are among the alloy's more outstanding characteristics...
 An alloy-saver, it does not contain strategic columbium.

By R. W. GUARD and T. A. PRATER.

Research Associates, General Electric Research Laboratory, Schenectady, N. Y.

♦ A NEW SUPER ALLOY has been developed which retains its high strength for extended periods of time at temperatures above 1500°F. The new alloy is of the nickel-chromium-cobalt type and can be readily forged. It contains none of the more strategic columbium.

A product of General Electric research, the new alloy moved from the initial laboratory stage to vital jet engine applications in less than four years.

In a search for a better gas turbine bucket alloy, a number of different combinations of base compositions and alloying elements were surveyed. By process of elimination, it was decided to concentrate intensive effort on the new material, now known as Jetalloy 1570. Composition limits of the alloy are shown in Table I.

The job of research set out to lick three basic problems. First, the effects of composition changes on mechanical properties had to be tackled in order to decide upon an optimum composition. Secondly, since the alloy develops its strength during precipitation hardening, aging behavior had to be clarified. Lastly, since the alloy was intended for specific engine parts, a good deal had to be known about its general forming and processing characteristics. This type of information was gained from a pilot plant operation, using 30 and 300 lb heats.

Six pound laboratory melts were sufficient to supply most of the answers required in basic research. These results tied in very nicely with the results obtained with the larger heats used in the pilot plant operation. Ironically, the larger heats usually produced material with even better properties. A well developed statistical approach minimized the number of tests required for supplying the basic answers.

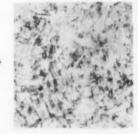
Getting the optimum composition was a prime objective. The effects of molybdenum, tungsten, and titanium were carefully analyzed. Preliminary work indicated that molybdenum and tungsten had similar effects. As work progressed, it became evident that both elements

Composition Limits of Jetalloy 1570

ELEMENT	PER CENT
Fe	1.5 to 2.8
Co	36.9 to 38.5
Ni	27.7 to 28.5
Cr	19.7 to 20.4
W	6.3 to 7.3
ना	4.0 to 4.5
C	0.17 to 0.27

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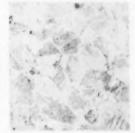


FIG. 1 — Iron-free alloy (a) does not contain discontinuous lamellar grain bound ary precipitate found in alloy containing 20 pct iron (b).

Table II

Properties of Jetalloy 1570

Stress-Rupture Properties				
Temperature (°F)	100 Hour Strength (psi)	1000 Hour Strength (psi)		
1200	98,000	84,000		
1300	72,000	60,000		
1400	49,000	38,000		
1500	34,000	24,000		
1600	22,500	15,500		
1700	13,500	8,000		

Tensile Properties

Temp.	Modulus of Elasticity (pel x 108)	0.2 per cent Yield Strength (psi)	Tensile Strength (psi)	Per cent Elongation
Room	33.7	81,000	152,000	30
1200	26.8	67,000	132,000	21
1350	26.3	70,000	105,000	8
1500		71,000	82,000	18
1600		49,000	56,000	20
1700		32,000	36,000	40
1800		17,000	20,000	70

were important beyond their so-called individual "additive contributions."

Molybdenum was slightly less effective than tungsten in improving rupture strength. Its effect on improving rupture ductility, however, was considerable. The importance of using the proper ratio of all alloying elements became more and more apparent. This principle applied as well to molybdenum and tungsten, despite their similarity.

The iron content of the base composition—to which molybdenum, tungsten, and titanium were added—was found to have a marked effect on rupture strength. Although low iron alloys showed a negligible drop in rupture strength after aging at 1650°F, alloys containing 20 pct iron were definitely inferior in rupture strength after the same aging treatment. The rupture strength of some of the low iron alloys at 1500°F increased after the 1650°F aging treatment.

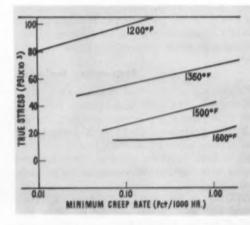


FIG. 2—The variation in creep properties with composition and treatment roughly parallels that in stress-rupture properties.

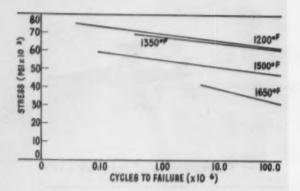


FIG. 3—Smooth bar fatigue strength of Jetalloy 1570 at 1500°F is superior to that of any commercial, high temperature austenitic alloy.

The reason for the deterioration of rupture strength was determined metallographically. Loss of strength evidently accompanies the formation of a discontinuous, lamellar grain boundary precipitate (Fig. 1). The precipitate occurs at lower temperatures and in shorter times for the higher iron base alloys.

To survey the effects of heat treatment, variations of both solution treatment and aging temperature were studied for all of the alloys. Differences in properties were correlated with changes in aging behavior.

Raising the solution temperature from 1950°F to 2300°F increased grain size and improved rupture strength. Some ductility was sacrificed. Pilot plant results indicated other less desirable effects of the higher solution treatment temperature.

Studies on a pilot plant basis proved to be particularly significant. All heats were vacuum melted and were within the composition limits shown in Table 1. The high titanium content was one reason for vacuum melting. Attempts to melt almost the same composition by conventional air melting have given inferior properties.

Fabricating the alloy

Fabrication of the alloy began with a 7 in. square ingot. The ingot was hammer forged at 2150°F to form a 2½ in. square billet. Rolling at 2150°F produced a 29/32 in. bar which was subsequently annealed at 1950°F and straightened. A final centerless grinding operation provided a ½ in. bar suitable for use as bucket blade stock.

Recovery of the ingot weight as centerless ground rod was on the average of 60-70 pct. Most of the loss resulted from end-cropping and centerless grinding.

A comparison of material from 30 and 300 lb heats showed the importance of working the al-

loys as much as possible. The larger heats yielded material having 20-40 pct longer life in stress-rupture. This difference also existed between 6 lb laboratory heats and larger pilot and commercial heats. In almost every case, the larger heats had superior properties.

Study heat treatment

In the pilot plant studies of heat treatment, the object was to produce the best properties for aircraft gas turbine bucket operation. The effect of various heat treatments were judged on the basis of stress rupture and fatigue tests.

Results showed that rupture strength increases slowly as the solution temperature is raised. Fatigue strength and ductility drop off markedly above 2250°F. For this reason, it is now standard practice to solution treat at 2150°F before aging.

A study of the effect of different aging treatments on rupture strength showed that the properties were much the same when aged in the range of 1300°-1650°F. However, in order to meet the requirement for tensile ductility, it was found to be necessary to age at 1650°F. This treatment gave the required ductility with very little loss in strength.

Since the completion of the research and pilot plant programs, several thousand pounds of alloy were produced. Typical stress-rupture and tensile properties derived from an adequate sampling of heats are shown in Table II.

Properties checked

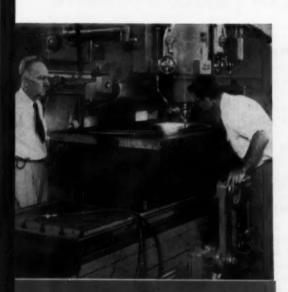
In addition to sufficient strength, a high temperature alloy should not have any shorter life when notch-rupture tests are made. Accordingly, tests were run on Jetalloy 1570 from 1200°-1700°F. They indicate that the material is notch ductile at all temperatures above 1350°F. The criterion for notch ductility, incidentally, is that the rupture life be longer when measured using a notched test specimen than when an unnotched specimen is tested.

Creep properties at low strains were not investigated because the alloy was originally designed for turbine bucket use. Deformation measurements were made during the stress-rupture tests. These indicate that the variation in creep properties with composition and treatment roughly parallels that in rupture properties. Minimum creep rate for several test conditions is shown in Fig. 2.

Fatigue properties after the standard heat treatment are shown in Fig. 3. This information indicates that the 1500°F smooth bar fatigue strength of this alloy is superior to that of any commercial high temperature austenitic alloy. The notched fatigue tests on bars with a stress concentration factor of 2.6 show that the alloy is notch ductile in fatigue as well as stressrupture. These results further underline the alloy's usefulness.



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New Technical Literature:

Catalogs and Bulletins

Diesel engines

"Danger in the Heat Zone," an 8-page folder, discusses how heat prostration in vital parts of diesel engines can be avoided, through sound metallurgy and careful machining. Factors contributing to dependability of Cat engines are described, including design, processing to specifications, machining to close tolerances and rigid inspections required to insure long life. Also available in French, Spanish, and Portuguese. Caterpillar Tractor Co.

For free copy circle No. 1 on postcard, p. 125.

Traveling cranes

Traveling cranes, both hand-powered and motor-driven, are described in new catalog literature. Photos illustrate the various equipments available, and capacities and suggested applications are given together with specifications. Reading Crane & Hoist Corp.

For free copy circle No. 2 on postcard, p. 125.

Lift trucks

An attractive four-color folder describes the new KGA51 series of industrial lift trucks with Yale Torque transmission. A phantom view permits a visual presentation of all the internal features of engine and transmission of the 3000 to 8000 lb trucks. Yale & Towne Manufacturing Co.

For free copy circle No. 3 on postcard, p. 125.

Transfer machine

A new transfer machine which moves large sheet metal panels between presses automatically is described in a bulletin just released. Schematic drawings show the operation of the machine in transferring or turning over and transferring panels, and illustrations of the equipment in use are included. Sahlin Engineering Co., Inc.

For free copy circle No. 4 on postcard, p. 125.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 125.

Automatic gear grinders

A newly-developed line of fully automatic gear grinding machines is described and illustrated in an 8-page bulletin. The brochure contains information on six new automatic features contributing toward increased quality and production of gears and includes photographs and descriptions of the complete line of machines available. The Gear Grinding Machine Co.

For free copy circle No. 5 on postcard, p. 125.

Refractories

A new 12-page booklet just issued describes the manufacturing methods used to produce hydraulic-setting refractories for services through 3000°F. Then, it describes how and where to use the 5 different types of Firecrete for castables. The 3 types of Blazecrete for gunning and slap troweling are similarly presented. Johns-Manville.

Pyrometer servicing

A new bulletin gives service tips for pyrometer users. Questions covered include "What to do if instrument reading is erratic," "instrument temperature curve off," "instrument reading too high," etc. Instrument men should find this bulletin a convenient reference source. Wheelco Instruments Div., Barber-Colman Co.

For free copy circle No. 7 on postcard, p. 125.

FREE TECHNICAL LITERATURE

V-belt drive selection

Copies of the 74-page booklet "Tex-Book" are offered. The booklet carries handy tables for quick and easy selection of constant speed V-belt drives for A, B, C, D, & E section, and includes data on design features, basic drive principles, and technical information on sheaves, together with helpful hints on economical, safe and dependable operation. Allis-Chalmers Manufacturing Co.

For free copy circle No. 8 on postcard, p. 125.

Extension bed gap lathe

Specifications, design and constructional features of the Imperial 20 to 40-in. extension bed gap lathe are included in a new folder. Photographs illustrate the lathe with gap closed, to accommodate standard engine lathe turning to 24-in. in diam, and with gap open for outsize work to 42-in. diam. Nebel Machine Tool Corp.

For free copy circle No. 9 on postcard, p. 125.

Power hack saws

Bulletin 655 covers the company's complete line of power hack saws, which now have a capacity range of from 4 by 4-in. to $10\frac{1}{2}$ in. wide by 9-in. high. Specifications and price information for each model illustrated are included. Keller Tool & Machine Works.

For free copy circle No. 10 on postcard, p. 125.

Press room equipment

A catolog illustrates and describes the Company's greatly increased line of roll feeds, scrap choppers, straightening machines, coil cradles, two-hand lever control and two new machine shop and toolmakers vises. *Durant Tool Supply Co.*

For free copy circle No. 11 on postcard, p. 125.

Soft solder alloys

Some special soft solder alloys are shown in chart form in a bulletin, which also contains brief descriptions of the alloys and some of their suggested uses. For example, alloy #106 is supplied in solid wire, plastic rosin, and energized rosin. It is used for sequence soldering and high temperature applications. Alpha Metals, Inc.

For free copy circle No. 12 on postcard, p. 125.





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FREE TECHNICAL LITERATURE

Punch presses

A 17-page bulletin called "Profit from Presses" is available. It shows case history photographs of various punch press applications and tells how various design and operating features of the presses make them the best selection for the application described. Eight models of sheet metalworking machines are shown on the back of the bulletin. Diamond Machine Tool Co.

For free copy circle No. 13 on postcard, p. 125.

Hand lift trucks

Bulletin 555 - 1 covering single stroke hand lift trucks has been released. The capacity of the R model truck has been increased from 3500 to 4000 lb in recognition of the current trend toward moving materials in heavier loads to reduce handling costs. These trucks meet handling needs economically, and often save the necessity for taking a big truck from its regular work. Rarrett-Cravens Co.

For free copy circle No. 14 on postcard, p. 125.

Engine lathe

A 4-page bulletin illustrates and describes the 16-in. heavy duty, 18 speed engine lathes, Series BB, made by the Company. Bulletin includes details on construction features of the headstock, tailstock, motor, carriage, quick-change gear box, taper attachment, apron, and bed. Specifications are given. Boys & Emmes Machine Tool Co.

For free copy circle No. 15 on postcard, p. 125.

Vertical grinders

Bulletins 197 and 198 cover the Company's line of vertical universal grinders, describing general operation and constructional features and illustrating some specific kinds of applications. Specification data is given. The Springfield Machine Tool Co.

For free copy circle No. 16 on postcard, p. 125.

Rebuilt machine tools

Guaranteed rebuilt machine tools currently offered are described in 42-page catalog No. 202. Complete specifications are given and photos illustrate many of the machines. Miles Machinery Co.

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7 benefits received by switch to STANOSTAMP Compound C

Jagemann Stamping Company, Manitowoc, Wisconsin, benefited seven ways by switching to Stanostamp Compound C. Finished ferrules drawn from 19 gauge cold roll steel were being badly scored. At the same time dies were being scratched and excessive heat experienced in the press. Standard Oil lubrication specialist R. E. O'Brien suggested Stanostamp. The result:

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STANOSTAMP Compound C is a water emulsifiable paste for heavy drawing operations. It contains an inert, non-abrasive mineral filler for protection of dies and work, is readily cleaned from work in conventional washing equipment. In the Midwest, your nearby Standard Oil lubrication specialist will be glad to tell you more about STANOSTAMP. Call him. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



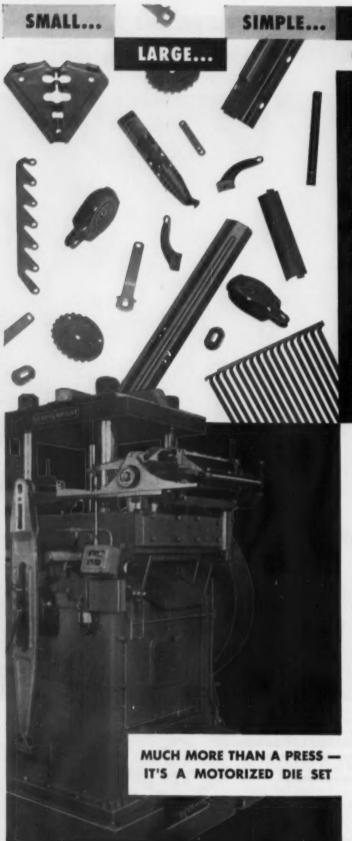
Father and son inspect ferrules.
William P. Jagemann (left),
President, and son William T.
Jagemann note improved finish
on work produced using
STANOSTAMP.

Air hose ferrules. One at right produced before switch to STANO-STAMP, one at left produced after conversion to this forming compound. Scoring of dies as well as work occurred before switch.

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FREE TECHNICAL LITERATURE

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This section starts on p. 120

Drill units

Automatic, electrically controlled, mechanically driven units for drilling, tapping and allied operations are described in a 12-page catalog on Cam-matic drill units. The literature covers features of the equipments and gives specifications, dimensions, and mentions other products made. Morris Machine Tool Co.

For free copy circle No. 18 on postcard.

Metal laminate

A 4-page bulletin describes Sullvyne-Clad metal laminate, its advantages and typical applications as a decorative or protective finish. Physical and chemical properties of the laminate are listed in chart form. Metal Laminate Div., O'Sullivan Rubber Co.

For free copy circle No. 19 on postcard.

Bolts and nuts

Lists prices, weights per hundred and container quantities of bolts, screws and nuts are tabulated in catalog 55A. The 40-page catalog also covers plate washers supplied by the Company and lists head dimensions and gross extras. Pawtucket Manufacturing Co.

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Tooling catalog

Seventeen styles of new low cost Kendex tooling with throwaway inserts are covered in an 8-page catalog. The publication describes how the tools save money, describe some of the product features and illustrate and give specifications on the Kendex button tools and heavy duty tools offered. Kennametal, Inc.

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Hole punching units

Comprehensive data on Type BL Hole Punching Units for punching mild steel to 1/8-in. thick is contained in a 20-page catalog. units are described as self-contained and capable of being set up in unlimited patterns, by locating and locking the units into exact position on T-slotted plates or press brake rails according to master templets, or on mounting plates. Wales-Strippit Corp.

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Drawstring bags

Applications for cloth drawstring bags are suggested in an "Idea Kit" now offered. Several types of cloth drawstring bags are sent with the folder, which shows how they may be used for packing hardware items, fasteners, small mail replacement parts, machinery parts, etc. Millhiser Bag Co., Inc.

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Chipless machining

An 8-page bulletin covers the complete line of Roto-Flo "chipless machining" machines for cold-forming of toothed parts. The bulletin describes the three standard sizes available and shows examples of the machines in typical operating setups. Michigan Tool Co.

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Steel projects

"Steel Projects Designed and Built by Kaiser Engineers" shows various steel mills, oxygen converters, mine construction, water treatment plants, electrical installations and other projects the Company has designed and built. Kaiser Engineers Div., Henry J. Kaiser Co.

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Postcard valid 8 weeks only. After that use10/20/55 own letterhead fully describing item wanted.

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New York, N. Y.

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Silicone lubricants

Technical information on new silicone lubricants now available for jet aviation and industry is offered. Designated Versilube F-50 and Versilube G-300, the new lube fluid and grease are believed the first such lubricants made commercially available. Operating temperature range of the new lubricants is described as being from -100 to +400°F. General Electric.

For free copy circle No. 26 on postcard.

Buffing, finishing compounds

Revised technical bulletin T-5 describes the company's buffing and finishing compounds. Both bar and liquid abrasive compositions which have been proved in industrial applications are covered. Particular attention is called to the stainless steel compounds for both cutting and coloring applications and to one for coloring nonferrous metals. The Globe Compound Co., Inc.

For free copy circle No. 27 on postcard.

Financing plans

A new folder is now being offered describing the various financing plans available to purchasers of Bryant internal grinders and precision boring machines. The folder describes conditional sales plans, both short- and long-term, covering types of equipment eligible, down payment, installment, etc. Bryant Chucking Grinder Co.

For free copy circle No. 28 on postcard.

Broaching machine

Features of a continuous broaching machine which has an effective stroke length of 154-in., with overall machine height only 138-in., are covered in bulletin VCA-55. Construction, operation, controls and specifications are included. Colonial Broach & Machine Co.

For free copy circle No. 29 on postcard.

Aluminum trucks

Pictures and specifications of Magcoa-Tobe standard flat bed, multiple-deck and fixed-end trucks as well as information on accessories and a variety of special duty trucks is given in a 4-page folder just published. Magnesium Co. of America, Tobey Aluminum Div.

For free copy circle No. 30 on postcard.

Combustion services

Literature outlining products and services available from this company is offered. Of interest to companies with combustion and heat transfer problems, the 8-page bulletin describes some possibilities in applying high-velocity techniques, and shows some typical combustion problem solutions. Thermal Research & Engineering Corp.

For free copy circle No. 31 on postcard.

Hydraulic booms

A 12-page bulletin shows the complete line of Hydra-Boom hydraulic booms for use in the construction and mining industry. The bulletin gives typical applications, compares the booms with wagon drills in construction work and with column-mounted drills in mining and tunneling. Ingersoll-Rand.

For free copy circle No. 32 on postcard.

Book preview

A 4-page folder describing the contents of its new, 424-page book "Holes, Contours and Surfaces: Located, Machined, Ground and Inspected by Precision Methods," is available. The folder lists subjects covered in the book's 14 chapters and special Woodworth Circular Tables section, and includes typical examples of the more than 450 closeup photographs and working drawings in the book. Moore Special Tool Co., Inc.

For free copy circle No. 33 on postcard.

Indicating pyrometers

A new 2-page bulletin, F 6048-1, describes the Company's indicating pyrometers, available in two styles in ranges to 3600°F. A combination indicating pyrometer and multi-position switch is also shown. Barber-Colman Co., Wheel-co Instruments Div.

For free copy circle No. 34 on postcard.

Instruments, controls index

A handy pocket-sized booklet lists L&N file publications available in instruments for research, teaching and testing; for industrial measuring and controlling, and for power plants, as well as the Company's line of heat-treating furnaces. Leeds & Northrup Co.

For free copy circle No. 35 on postcard.

INDUSTRY GEARS FOR HIGHER PRODUCTIVE STANDARDS



Ips LUKENS

quenching, twists and warps like a piece of shoe leather left out in the rain. The sections of plate—armor up to 8° thick or carbon steel up to 15° thick—require enormous pressure to straighten them out.

are operated from the pulpit-fike control.

Few people have a problem like this particular one, but all companies are constantly faced with the critical problem of uncreasing productivity. If you're looking

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RELIANCE Job-Fitted

COLD ROLLED STRIP STEEL

Coils . Cut Lengths . All Tempers

SHEETS

Cold Rolled . Hot Rolled . H.R. Pickled Galvanized . Long Terne Standard or Production Sizes Sheared or Slit to Actual Working Dimensions

Looking for Man-Size Cold Rolled Strip?

Most cold strip mills shy away from the heavier gauges. As the thickness goes beyond .062" or .083", the number of sources gets thinner; over .150", they're few and far between.

Why is this so?

For one thing, it's a matter of heavy enough equipment to stand the gaff. Another thing is experienced enough manpower. There's a knack in manipulating thick-steel hot bands and cold strip coils and cut lengths.

Our strip mills happen to have what it takes on both counts. Heavy strip (up to about 3/16" at Detroit, 5/32" at Hamden, Connecticut) is "duck soup" for us. We have the husky-enough pickling machines, cold reducing mills, slitters, edgers, flatteners, cut-up lines and related equipment.

DSC stripmakers are heavy-gauge minded. Man-size strip is all in our day's work—and has been for over 30 years. Fact is, we're equipped and manned to take good care of most requirements for cold rolled strip, either thick or thin.

How about your own stamped or roll-formed jobs that could profitably use cold reduced flat rolled steel in regular bright or satin finish, job-fitted temper and tight thickness tolerance?

For quick help, call your nearest DSC Customer Representative. He'll be glad to work with you.

Customer Satisfaction is our No. 1 Job



DETROIT STEEL CORPORATION

DSC CUSTOMER REPRESENTATIVE OFFICES

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DSC MILL PRODUCTS

Hot Rolled and Cold Rolled Sheets

Cold Rolled Carbon Steel Strip Flat Cold Rolled Carbon Spring Steel Low and Medium Carbon Manufacturers' Wire High Carbon Specialty Wire Aluminum Cable Strand Reinforcement Rope Wire Tire Bead Wire Welded Wire Fabric

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Put life insurance on your forging dies!

The most critical period in the life of a forging die is its first few hours of use. Longer life is assured if adequate and proper lubrication is available during the break-in period.

Treat your dies with 'Aquadag' - 'dag' Colloidal Graphite in water—before they are used. This forms a microscopically thin and smooth film which assures necessary lubrication and reduces the need for operational lubricants. Also, it protects the surface against corrosion during storage prior to use. One forging plant increased die life 90% merely by pretreating its steel forging dies with 'Aquadag'.

Superior forging lubricants, either water-base or oil-base, can be prepared by adding a dispersion of 'dag' Colloidal Graphite to conventional die lubricants. 'dag' dispersions provide better parting, improved lubricity, and greater heat resistance; they also reduce lubricant costs, scrap losses, and die failure.

Write today for Acheson's free literature on forging lubricants. Ask for Bulletin No. 426-Q2.

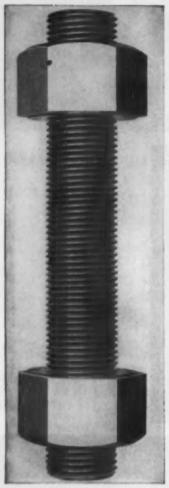
Dispersions of molyhdenum disputide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of carriers.

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FORT HURON, MICHIGAN
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use dag dry films for trouble-free lubrication





WHEN IT'S Special BOLTS and STUDS

Send your Specifications to



40 years' experience in making special bolts, studs, nuts for specific job requirements.



REPRESENTATION IN PRINCIPAL CITIES

TOOLING: Less Milling Time

Changeover to carbide cutters dropped milling time from 4 hours to 65 minutes . . . More desirable finish now possible.

A 79 pct reduction in profile milling time on sandy cast steel pump brackets was recently realized at DeLaval Steam Turbine Company, Trenton, N. J., by using standard face Kennamills which permitted increased speeds and feeds and produced a higher microinch finish.

Rough and finish milling time, on an Ingersoll planer type 75-hp mill, for both ends and joint face on the pump brackets dropped from 4 hours to 65 minutes when the switch was made from high-speed steel cutters.

Previous tooling

Prior to the use of Kennamills, the company used three 12-in. diam high-speed steel cutters under the following conditions: Roughing—5 ipm feed, 75 sfm and ¼ to ¾ in. depth of cut; finishing—6 ipm, 110 sfm and 0.010 in. depth of cut. A second set of cutters, with a modified grind, was required to remove feed marks. Cutter life was one piece per grind on roughing and two per grind on finishing.

Because of the three to four-hour reconditioning time on cutters, which followed frequent cutter changes, production rate was low.

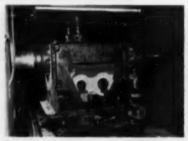
However, with the 12-inch "Universal" face Kennamills, the job is now run with increased feeds and speeds—12 ipm roughing and 7 ipm finishing while the sfm is 300 for roughing and 600 to 700 for finishing. Depth of cut is ½ to 3½ in. on roughing and 0.030 on finishing.

Cutter life is now five pieces per grind, using the same cutters for both roughing and finishing. Time for reconditioning a cutter has been reduced to one hour.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 125. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

A more desirable finish of 40 to 60 microinches is now possible as compared to the 75 to 125 microinch finish attained through the use of the high-speed steel cutters.



Faster milling . . .

Materials:

Inconel extends burner-shell life.

Greatly increased service life for burner shells is reported by Selas Corp. of America, Philadelphia, as a result of using Inconel in their construction.

Studies were made in connection with air-gas burners used in automatic machines for localized flame hardening and brazing. In this application, heat transfer to the work is accelerated by a super-hot stream of burned gas, which issues from the burner nozzle at a speed and temperature usually as-

TECHNICAL BRIEFS

sociated with jet engine operating conditions. Thermal impact is so high that some products can be heated, formed and delivered by the jet action.

500 Hours Service

The frequency with which burnouts were occurring when another high temperature alloy was specified, led the company to initiate a search for better materials. Since



Longer burner shell life . . .

high strength at elevated temperatures was a primary requirement, Inconel was eventually selected for this service.

Improved performance was apparent in less than a month. The improved shells have delivered a minimum of 500 hours of service. When the former material was used, burnouts occurred in a fraction of that time.

Inspection:

Gages parts at production speed.

A gage that is an integral part of the production line measures ball studs for V-8 engine valve rocker arms for outside diameter and for the presence of an oil hole,



To 5000 parts per hour . .



New Handling System increases production while eliminating two lines

In one of the automotive industry's newest plants, production of frames for 1955 models was lagging, even though 6 lines were being used. Then Planet engineers were consulted.

They designed and installed a new frame handling system which exceeds current production requirements, doubling the output of the old-style line. Now only 4 lines are used. In addition, quality has been improved.

Here's how the system operates. The component parts of the frame are delivered by trolley conveyor to a frame assembly conveyor where they are automatically positioned for tack welding. The assembled frame is then discharged on to the frame welding conveyor illustrated above.

Here the frames are automatically rotated, 90° at a time so that all finished welding is done on a horizontal plane as the frames move by each welding station. Frames are then automatically conveyed through checking, cleaning, and painting operations,

If you have a production problem, why not consult Planet Corporation engineers? Write or phone today. There is no obligation.



CONVEYORS

• ENGINEERED SYSTEMS

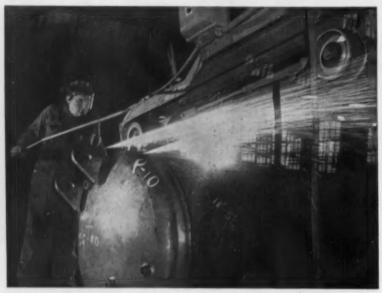
FOUNDRY EQUIPMENT

AUTOMATION

STEEL FABRICATION

"IT PAYS TO PLAN WITH PLANET"

How would you SOLVE IT?



PRODUCTION PROBLEM: To speed production and cut costs of removing extra-thick weld seams from 2% ton industrial boiler drums. Drums are made of 1" thick steel sections, welded together. Wickes Boiler Co. was using grinding wheels—found them slow, unsatisfactory.



SOLUTION: A 3M Representative suggested that this Saginaw, Michigan, manufacturer switch to the 3M Method using Three-M-ite Resin Bond belts installed on a swing grinder. Manufacturer found that each 3M belt removed these extra-heavy-duty welds faster, better.



Made in U.S.A. by Minnesota Mining and Manufacturing Company. General Offices: 8t. Paul 6, Mino. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Pressure-Sensitive Tapes, "Scotch Brand Magnetic Tape, "3 M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Bafety-Walk" Non-Blip Surfacing.



RESULTS: An immediate production increase with much higher quality finishes. (Note: manufacturer experimented with a "Brand X" belt, found it averaged only 9 feet of weld per belt..., 3M belt removed 30 feet!) A 3M Representative can help you solve your grinding and finishing problems, too. Call him today. There's no cost or obligation.

WANT MORE INFORMATION?

☐ Send me free b ing with 3M A	ooklet: "Weld Grinding & Blend brasives"
☐ Please have 3h	f Representative call.
Name	Title
Сопрану	
Address	
City	Zone State



TECHNICAL BRIEFS

and either accepts or rejects them at a speed of between 3600 and 5000 parts per hour.

From the conveyor feeding the gage, made by Federal Products Corp., Providence, R. I., parts drop into an inclined feed tube and come to rest on parallel, spring-loaded slides above the gaging contacts. A cam-operated pusher then moves the workpiece between the gaging contacts. The gage then checks the outside diameter and sends a size signal to the power unit. The power unit, in turn, actuates relays which control the disposal chute, sorting the parts as being either scrap or good.

Oil Hole Check

At the same time the diameter check is being made, a jet of air is blown into the workpiece. If an oil hole is present, the air will escape and no action will take place in the power unit. However, if there is a partially blocked oil hole or no oil hole at all, the back-pressure of the air causes electrical contacts to close, sending a signal to the power unit, which sets the disposal for discard of the workpiece.

The speed of the gage makes it possible to inspect every ball stud made on the production line without slowing the line.

Casting:

Vacuum furnace built for investment process

The first vacuum melting furnace designed specifically for the investment casting process has



Eliminates harmful gases...

been put into operation on an experimental and pilot production basis by Austenal Laboratories,

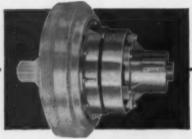


Levinson takes your fabricating order your job will be delivered as specified and on time. This reputation for being on schedule plus top quality design, fabrication and erection is another reason why we say: "Leave it to Levinson." Warehousers, fabricators, designers of steel for over half a century.

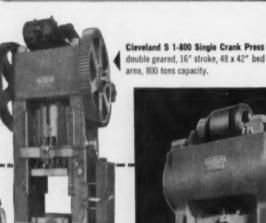


Less Down-Time With CLEVELAND Presses

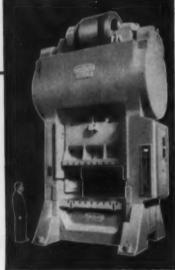
Powered by the Clutch that's



"Revolutionizing" Production



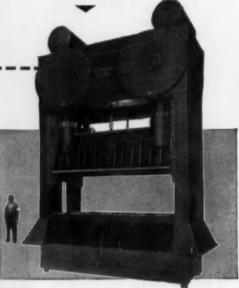
double geared, 16" stroke, 48 x 42" bed area, 800 tons capacity.



Cleveland \$ 2-350-60-42 Double Crank Press, 8" stroke, 42 x 60" bed area, 350 tons capacity.

Why not investigate the production economy built into every Cleveland Press Equipped with our patented Cleveland Drum Type Clutch. Won't you let us give you the complete Cleveland story? Write or call today!

Cleveland \$ 4-800-204-102 Four Point Press, 40" stroke, 102 x 204" bed area, 600 tons capacity.



It doesn't matter which of the 11 types of Cleveland presses best meets your requirements. For as long as it is equipped with our patented Cleveland Clutch, you can be confident that you are getting a press that will give you the best performance obtainable. This proven clutch unit assures minimum down-time, positive, fast control and lower operating costs.

Designed with a minimum number of parts. the patented Cleveland Drum Type Friction Clutch requires only minor adjustments. There is less chance of failure. Its light-weight construction reduces horsepower required for operation. Operational studies prove it to be completely dependable.



Established 1880

132

40TH & ST. CLAIR AVENUE . CLEVELAND 14, OHIO Offices at: NEW YORK . CHICAGO . DETROIT . PHILADELPHIA . E. LANSING . OXFORD, O. CITY FOUNDRY DIVISION . SMALL TOOL DEPARTMENT



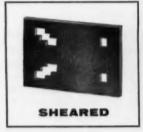


















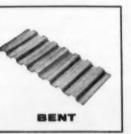








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You can slash production costs 5% to 25% . . . and get greater versatility and design freedom . . . with parts pre-formed from rolled carbon, alloy or clad steel plate.

Using By-Products Steel Co.'s Steel Plate Shapes Service, you get close tolerances that permit quick and easy incorporation into assemblies, often without further finishing. Men and machines can be freed for other work, and reduced fit-up time and the elimination of production steps speeds operations.

Reduced freight and handling charges and less need for costly plate inventories are additional benefits of this service. Over 150 major machines and an extensive standard die stock are available. Work can be done directly from blueprints in the finish you specify: as formed, rough- or finish-machined.

Your parts can be formed from plates up to 195" wide or 25" thick. Our location adjacent to the facilities of the world's leading producer of specialty steel plate assures flexibility in forming and heat treating to your specifications. For additional information on how you can put this Service to work, write on your letterhead for Bulletin 712. Address: By-Products Steel Co., 741 Strode Avenue, Coatesville, Pennsylvania.



STEEL PLATE SHAPES SERVICE

BY-PRODUCTS STEEL CO.

A Division of Lukens Steel Company, Coatesville, Pennsylvania

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Accidents averted, man-hours saved.

only one inventory. No loose pieces. Pilferage eliminated.

· Single-source buying of both Round and Flat Steel Strapping reduces freight charges and paper work.

Bring your packaging and tying problems to USS GERRARD. Our engineers are here to help you solve them-at no cost to you.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION General Offices: Chicago, Illinois



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Company	
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State	

USS GERRARD STEEL STRAPPING Round and Flat

UNITED STATES STEEL

TECHNICAL BRIEFS

Microcast Div., at its Dover, N. J.,

Introduction of vacuum melting to investment casting is expected to extend considerably the versatility of the process, permitting the use of a wider range of alloys and insuring greater strength and ductility of alloys now being used.

Vacuum Melting Advantages

Specifically, the melting of metals in a vacuum eliminates harmful gases, and undesirable oxides and slag compounds. The appearance of these elements in a standard melting process has limited the choice of alloys used in investment casting to those that are not affected, or are affected only slightly, by these factors.

The process is used primarily to mass produce small precision parts in a wide variety of alloys, ranging from the high strength. high temperature alloys, through the stainless steels, to the carbon and low alloy steels.

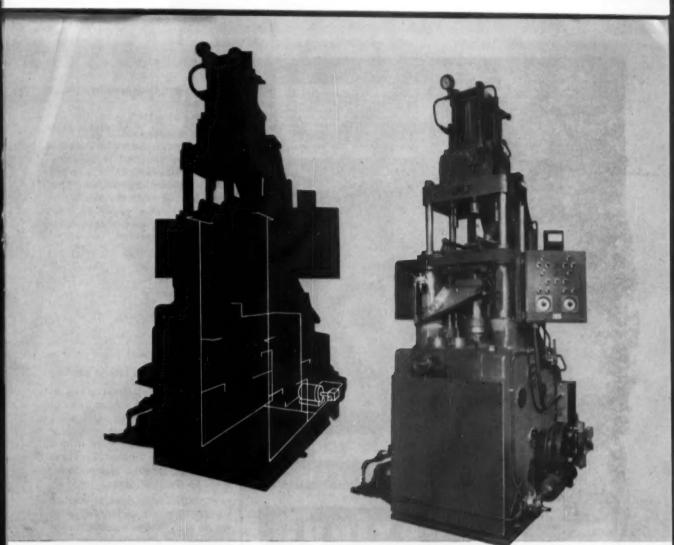
Shipping:

Load device transports coil, sheet steel.

A unique multi-purpose skidtype load device for the transportation of coil steel and bundled sheet steel in open-top cars has been placed in service by the Pennsylvania Railroad. The unit eliminates the need for blocking, wrapping and dunnage, reduces loading and unloading time and expense and protects the cargo from the elements by use of a



Loads coil, sheet steel



Model L

AUTOMATIC LUBRICATION protects new Baldwin powdered metal presses

Baldwin Model "L" and "C" powdered metal presses are just what you need for highest-quality and lowest-cost production. That's true because these new 50 and 100 ton presses are the first designed specifically for compacting metal powders.

A big reason why you'll get such low cost production is their automatic lubrication. In both presses a gear type oil pump, independently driven by a fractional horsepower motor, automatically lubricates all moving parts continuously. It forces filtered oil through a drilled crankshaft to the crank and connecting rod bearings. It pressure lubricates all other bearings subject to load.

Baldwin Model "L" and "C" presses are designed so that all moving parts are completely enclosed and sealed. Abrasive powder and dirt can't get into the bearings. These presses automatically fail to operate unless there is oil pressure in the lubricating system. An easily serviced oil filter provides further protection.

No other powdered metal presses have been designed just to meet your end product's needs. That's why Baldwin's new presses are your best buy. Only they can give you such uniform compacts and so little press maintenance because they both have automatic lubrication, hydraulic heads, shuttle type feeders, sealed mechanism, simple fill adjustments and variable cycling.

For more details about "L" and "C" please write to our Dept. 3816, Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa.



EDDYSTONE DIVISION

BALDWIN-LIMA-HAMILTON



"On the average, 50 tons of material must be moved to produce 1 ton of product." That's what material handling authorities say.

How many tons (or pounds) must be moved to get out *your* finished product? The ratio is seldom 50 to 1 in any one plant, but the chances are that a reduction in handling costs will mean a substantial cut in your total costs.

There is a Logan engineer near you to serve you and remember, too, those really low maintenance figures when you specify Logan Conveyors.

LOGAN CO., 545 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

metal cover, thus keeping damage to a minimum.

Adaptable skids

Formerly, companies loading steel were required to do extensive blocking with timbers to protect both sheet and coil steel. They also had to wrap the bundles of steel in treated paper or other material, as protection against the elements.

Adaptable to both flat steel and coil steel loading, the device can accommodate both sheet and coil steel on the same skid. Skids are 21 ft, 9 in. long, including the heavy rubber snubbers on the ends, which absorb any possible shock. Overall width is 7 ft, 1 in.

No lateral shifting

The skid has adjustable steel bulkheads on each end and in the center. Bulkheads are 4 ft high. Also, skids are equipped with side braces of metal and wood, which attach to the bulkheads. These prevent any possible lateral movement by the steel cargo.

Six adjustable insert bearing pieces of wood and steel, with which each skid is equipped, support flat steel for longitudinal loading. When coil steel is loaded, the bearing pieces are removed from the bed of the skid, and stored in the end, between gussets, so that they may be readily accessible when needed again for flat steel loading.

16-ft load length

Maximum loading length on each float-type skid is 16 ft, 2 in., and each 52 ft, 6 in. steel gondola car has a 7-ft floating area on its wooden floor after the two skids and their loads are in place.

A specially-designed hood or cover completely encompasses the top, ends and sides of each loaded skid. It is made of 1/16 in. sheet steel and is domed to resist rain, snow, sleet and dirt.

Starting with 15 cars, all equipped with the new load devices in its own shops, the railroad expects to have 65 cars in service by the end of this summer.

TECHNICAL BRIEFS

Welding:

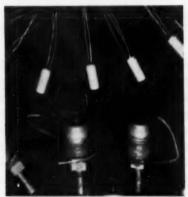
Koldweld process seals semiconductor parts.

Transistors and other semiconductor devices, usually housed in sealed containers to prevent contamination, are being manufactured by the G. E. C. Ltd., of England, using the Koldweld process for sealing the base to the housing. The method has greatly reduced rejects.

The method involves arranging metal jigs with a number of tubular housings therein. Other jigs contain the bases with the semiconductor units and insulator terminals. Both are clamped together so their edges abut. These jigs are then placed in a sealed metal housing arranged around the lower part of a small punch press. Controls outside the housing provide for moving the jig from one unit to another.

Fast Operation

The press operation is controlled by a foot switch. As each unit is welded by the press operation, without heat, electricity or any fluxes applied, the units are



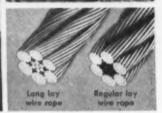
Koldweld-sealed parts . . .

moved along so that the complete operation takes but a few seconds for each unit. After the entire row is welded, the sealed housing is opened and replaced by another jig.

The welding process involves no risk or damage to the operative part of the semiconductor device, either by the evolution of heat or by materials such as a soldering







What extra good will Leschen Lang lay wire rope do for you?

Look at a length of Lang lay wire rope. Compare it with regular lay. Notice that the wires in Lang lay rope twist in the same direction as the strands. In regular lay rope these directions are opposite.

What does that do? It makes the exposed length of the outer wires in Lang lay rope about twice as long as in regular lay rope. It has extra bearing surface to withstand wear from scuffing, rubbing and other abrasive action. Also, because Lang lay wires and strands are laid in the same direction, the rope has greater flexibility.

What's the result? Simply this-on some types of duty, where abrasive and bending stresses are abnormal, Leschen Lang lay rope definitely lasts longer than regular lay. Replacements are fewer. Costs are lower. And, with Leschen you are assured of higher-than-rated quality for longer-thanexpected wire rope service

Can you use these benefits? To make sure, ask your Leschen man. Leschen makes all types of Red-Strand wire rope for all types of jobs, and can help select the best one for you. Perhaps you should use Lang lay. Talk to him soon.



Bepend on Leschen's higher-than-rated quality for longer-than-expected service.

LESCHEN WIRE ROPE DIVISION

St. Louis 12, Missouri



flux. This is particularly advantageous, the company says, where the device is small and the operative part includes a portion consisting of some readily fusible material such as indium. Also, the process permits carrying out the sealing operation in an inert atmosphere such as dry nitrogen, to provide a permanent inert gas filling for the envelope.

A pilot plant has been operating for some time and the units have withstood severe tests and service for over a year.

Cleaning:

Brushing deburrs parts 66 pct faster.

The four holes on this part, formerly individually deburred by hand, now are automatically finished in a few minutes by brushing

The setup is simple. The part is placed in a jig which holds it in



Quick brushoff . . .

position. The operator presses a button actuating the four air operated drills. Small wire brushes, the size of the ID of the hole, removed the threads.

Results are uniform, production steady. Cost is less.

Instruments:

Infrared instrument makes direct air analyses.

Air pollution is being investigated at Battelle Memorial Institute, Cincinnati, and in the Los Angeles area, by a technique which involves direct analyses of atmosphere with infrared spectrophotometers.

The Battelle researchers carried their Beckman IR-2 infrared spectrometer, conventionally a laboratory instrument, outdoors, then rearranged it so that its two halves could be placed up to 175 feet apart. The direct analysis method overcomes many problems. There was no trouble with small samples and low pollutant concentrations. Significant peak concentrations weren't averaged out by



long sample periods, and reactions which destroy grab samples before they can be examined were avoided.

Other Applications

Other possible applications of the technique include monitoring of industrial plant areas and onthe-spot analyses of vapor resulting from action of sunlight on freshly-plowed land, a possible aid to petroleum prospecting.

In Los Angeles, investigators using the same equipment also tried splitting it in half. They then simply folded the two halves back and used a plane mirror some 80 feet away to reflect infrared energy from the source back to the detector.

To reduce energy losses, the Los Angeles investigators have also used a 50 meter pyrex cell in some of their studies, directing the infrared beam through the cell for both total organic and hydrocarboned determinations in the atmosphere.

Finishing:

Better impregnation ups transformer life.

A new completely automatic method of varnish impregnation is giving specialty transformers made by General Electric Co. longer life expectancy.

Company spokesmen say the new system thoroughly impregnates the entire transformer coil with varnish, greatly improving dielectric strength and increasing transformer life by reducing burnouts. Pressure, as well as heat, forces the varnish through trans-



Improved impregnation

former coil and laminations so that every area is protected.

Remotely-Controlled Car

Key to the operation is a driverless car, remotely controlled for six-direction motion, which takes pallets of transformers into and out of a preheat oven, then transfers them into the pressure-vacu-

When is a semi-finished casting ... finished?

When Monarch produces semi-finished castings for your subsequent operations, product end-requirements are carefully studied to help you achieve lowest end cost. Monarch's wide experience in complete finishing, underwrites your operations from the very first casting produced. Check this unique "Value Analysis" approach to immediate savings on present and potential products. Monarch's one-source experience saves for you-all the way down the line.

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ARC FURNACES make possible high production of master alloy, out of which other beryllium copper forms are made.

Twenty years ago beryllium copper was an experimental alloy. Today it is a production material in widespread demand, used for its unique combination of strength, conductivity, formability, and dozens of other valuable properties. It is used in production tools, such as giant flash welders; in consumer products, such as refrigerators and cars; in developments as up to date as nuclear energy.

The Beryllium Corporation, world's most integrated producer of beryllium copper, foresaw this demand and took steps to meet it.

New sources of beryl ore, raw material of the beryllium industry, were sought out—with such success that the Government now says resources are adequate for both civilian and defense needs.

> APPLICATIONS UNLIMITED. This 16-page booklet describes scores of typical applications for beryllium copper. Send for your free copy ... loday.

neering help.



New alloys were developed. "Beryldur."

for example, is a new low-cost alloy

offering a combination of strength and

program made possible greater production, increased the range of sizes and

At the same time, mill service was supple-

mented with conveniently located ware-

house stocks of "Berylco" Beryllium

Copper. Leading nonferrous distributors

throughout the United States and Canada

now stock "Berylco" in a wide range of

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sizes for immediate delivery.

conductivity not hitherto available. A multimillion-dollar plant expansion

shapes, tightened tolerance ranges.



QUALITY CONTROL FOR MASS PRODUC-TION. This new direct-reading spectrometer analyzes beryflium alloys while they are still molten-

THE BERYLLIUM CORPORATION DEPT. 5K, READING 6, PA.

STOCKED BY WAREHOUSE DISTRIBUTORS THE COUNTRY OVER

um impregnator. After transformers have been treated with varish. the car is automatically retracted. then unloaded.

The new system, believed the only one of its kind currently in operation, was built and installed by Blaw-Knox Equipment Div. of Blaw-Knox Co., Pittsburgh, Pa.

Methods:

Drill activates hoist to move machinery

A Baltimore firm is using a 3/4 in. electric drill to accomplish the job of raising heavy equipment into position in buildings under construction.

General Elevator Company, Baltimore, manufactures and installs elevators in multi-storied buildings throughout the East. Locating the heavy elevator hoisting equipment in position atop a building presents serious prob-



Drill powers hoist . . .

lems. After encountering these difficulties on job after job, company engineers devised the new system, which works to their complete satisfaction.

Has reversing switch

A Black & Decker 3/4-in. heavyduty drill, with a speed of 275 rpm, was obtained and its chuck attached to a 6-ft pipe extension. The opposite end of the pipe extension was coupled, by means of a universal joint, to a chain fall located at the top of the elevator shaft. The drill is equipped with

TECHNICAL BRIEFS

a reversing switch which makes it a simple matter to swing or lower the equipment into position.

One man, using this rig, can lift extremely heavy weights into place. The 3/4-in. drill has been used in this manner to lift up to 8000-lb loads.

Forming:

Dies fabricated from resilient epoxies

Plastic-capped drop hammer dies suitable for forming duct halves, beads, angles, channels, and shallow pan sections have been developed by the Plastics Group of the Manufacturing Research & Development Dept., Republic Aviation Corporation.

The drop hammer dies are constructed of Kirksite bodies capped with a one-inch layer of epoxy resin compounds. The die face is composed of a rigid epoxy resin compound containing a wear resistant filler such as aluminum oxide. A resilient epoxy compound is used for the punch face.

Minimize wrinkling

The resilient compound is based on a combination of a liquid epoxy resin with a liquid polysulfide polymer. It cures at room temperature, in the presence of an amine catalyst, to a tough resilient material able to absorb the severe impact stresses developed in drop hammer operations. Punch faces of this type produce alumimum and steel parts with a minimum of wrinkling.

In making the dies, a plaster foundry pattern and a plaster cast are first made of the part to be formed. A female die is then rough cast from the plaster pattern and a male poured directly against the female.

Surface rough-sanded

The Kirksite bodies are then rough sanded to remove the surface oxide. The male plaster cast is waxed and positioned approximately one-half inch from the

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female body which will serve as the die face of the hammer. The unit is plaster dammed and held at a 45° angle with the Kirksite up, to permit entrapped air to rise to the Kirksite surface, away from the face of the die. The unmodified epoxy compound containing a suitable filler is then mixed with catalyst and poured into the gap.

After the resin is cured at room

temperature for several hours, the resultant plastic die face is waxed. The Kirksite male punch is positioned one-inch from the plastic die face and plaster dammed.

The resilient epoxy resin-polysulfide liquid polymer mix is mixed, poured into the gap and allowed to cure. Dies are parted and the plastic caps are then chamferred.

Machining:

Loading device speeds broaching operation

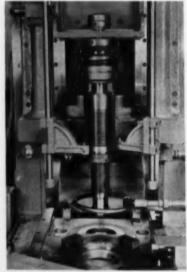
It is quite often possible to adapt a standard broaching machine for high rates of production without the extensive modifications which would be required by a complete changeover to automatic production.

Colonial Broach & Machine Co., Detroit, recently added a simple shuttling loading and unloading device to a standard Colonial RD 15-24, pull-down machine used to broach inside diameters of automobile differential ring gear blanks. The modification upped production to a rate of 300 gear blanks per hour, without entailing any basic changes in the standard 15-ton 24-in. stroke machine.

The operation consists of broaching an accurate internal diameter for location in the gear cutting operation that follows.

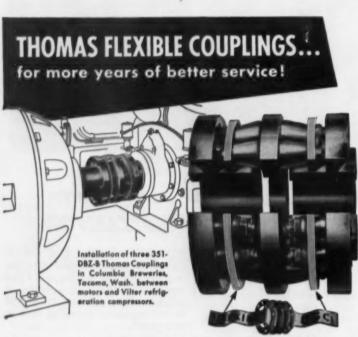
Hydraulic Fixture

A hydraulically-driven, shuttletype-loading fixture was devised and mounted on the work holding platen. Being a pull-down broach-

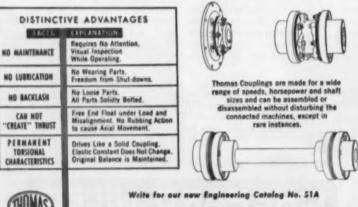


Faster loading . . .

ing operation, no auxiliary partholding clamps were necessary. The shuttling fixture only locates the part with respect to the broach. Machine and fixture cycles



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.





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TECHNICAL BRIEFS

are hydraulically and electrically interlocked for automatic operation.

A pull - down machine was chosen to produce the accurate internally broached parts, with gravity coolant flow keeping the work area free of chips. Performance and accuracy are thereby improved.

12-Second Cycle

Operating cycle for this operation consists of: (1) loading the part in the fixture in the retracted position; (2) energizing the cycle and moving the loaded fixture into broaching position; (3) starting broach downward stroke, engaging work-stroke puller, disengaging from automatic broach return puller and making the cutting stroke; (4) shuttling the fixture into unloading and loading position as broach is returned. Entire cycle, including manual loading and unloading, requires only 12 seconds.

Metals:

Superalloy seems good sheet material

Preliminary evaluation of the high-strength, vacuum melted super alloy 1570, indicates the alloy holds promise as a sheet material.

Developed by G-E Research Laboratory for use as a wrought turbine. bucket material for jet aircraft, and now being produced by G-E's Carboloy Dept., the alloy in sheet form appears to have greater strength than those sheet materials currently used for afterburners, tail cones and similar hot parts.

Company engineers report the vacuum melted alloy also seems to lend itself readily to joining by the inert arc welding method.

Tests of inert arc welded 1570 sheets, both manually and by machine, indicate that tensile and rupture strengths of the inert arc welded joints are essentially equivalent to base material properties. Ductility exhibited by the welded joints was considered very good. The alloy is not crack sensitive, and welds as easily as 321 stainless steel.



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5-3

PETERSON STEELS, INC.

UNION, NEW JERSEY

Detroit, Michigan . Chicago, Illinois

Handling:

Unit automatically transfers cylindrical loads.

Rolls of paper which formerly required a gang of men are being transferred from a belt to an overhead trolley conveyor by an automatic transfer unit.

Built by Lamson Corp., Syracuse, N. Y., the unit consists of a section of grooved live roll conveyor which is mounted on a carriage. The carriage moves at right angles to the direction of flow of the roll conveyor. The unit moves from a position in line with the belt to a position adjacent to the car of the overhead trolley conveyor.

Shockless Transfer

The load moves onto the roll conveyor to where it strikes a limit switch, stopping the roll conveyor. When an empty car on the overhead system moves into the loading position, the carriage moves forward, tilts the roll conveyor section sufficiently to roll



Replaces gang . . .

the load onto the car. The roll section levels and the carriage returns. A large cushioned bumper, located on the far side of the car and synchronized with the carriage, moves up and snubs the roll so as to bring it to rest in the center of the car with no shock to car or load.

This is accomplished by having the bumper moving in the same direction as the load at the time of contact, but at a slower speed. The overhead conveyor is moving forward at a speed of 30-ft per minute which also has a snubbing effect. The car is held in line by guide rails on the floor at the loading station.

The transfer unit has application to bales, drums, rolls and types of loads that may be rolled.

Metallurgy:

Economical ore-processing method sought

University of Wisconsin mining and metallurgical engineers are searching for an economical way to recover iron oxide from the millions of tons of low-grade iron ore available in northern Wisconsin.

The iron ore region, located in a 25-mile belt running from Pence northeastward toward Hurley and on into Michigan, is in the Gogebic range. Iron production in this area was worth about \$10 million to Wisconsin last year. But production from these mines is rapidly depleting known reserves of mer-

one American broaching machine



surface and internal broaching possible with American 3-way machine

To broach the lugs and cross holes of a universal joint, American engineers designed a combination tooling set-up on a standard American T-10-36 3-way machine.

Arranged with 3 stations, the machine surface broaches 3/16 stock off the inside and outside surfaces of the lugs at the center station; or broaches 1/32 off the I. D. of the lug cross holes at the two outer stations.

For more information on your particular broaching problem send a part-print or sample and hourly requirements.

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chantable ore, and is going deeper each year. Ultimately, mine depth will increase the cost of production to a point where even high grade ore will become uneconomical.

Large Low-Grade Deposits

But there are known deposits of many millions of tons of low-grade ore in the area. One study of the Gogebic range has shown that in a representative length of two miles of iron-bearing formation, more than 100-million tons of mostly low-grade, iron-bearing material could be mined by open-cut methods. And the iron content of the formation was generally uniform over the major length of the range.

Thus far the university's research work has brought out these facts:

1. Flotation could produce a concentrate of average grade of 55.41 pct iron and recovery of 48.3 pct from a total formation sample in laboratory tests. Fifty-five pct recovery of iron oxide is considered economically sound for some grades, but no commercial plant could now duplicate, on a large scale, the variations in this laboratory technique.

2. Magnetic separation tests have shown that the major part of the iron oxides are nonmagnetic, hence this method gives insufficient recovery.

3. Gravity separation tests have been partially successful, but the tabling method was found to give insufficient recovery of the iron oxide, and is too expensive.

4. The sink-float method—using a suspension with a specific gravity of 2.87, causing iron oxide to sink and silica material to float was found useful on some types of ores.

5. "Desliming," or taking out very fine dust size materials after crushing, in well-dispersed pulps, has so far been found to be nonselective and much of the iron oxide is lost in the process.

No Answers Yet

Because none of these methods seems now to be the answer, the researchers are seeking to improve the most promising ones to increase efficiency and reduce processing costs. For instance, in the separation methods where the ore-bearing materials are crushed to dust size, an increase in the amount of iron oxide recovered would considerably enhance the economic feasibility of the process. The investigators believe that use of repeated separation tests

with regrinding steps may increase the grade of concentrates, and permit a better iron recovery.

In their work with the magnetic separation process, UW researchers have devised a different type of laboratory magnetic separator, and have available a surface area measurement apparatus for the purpose of determining the surface area of fine powders.



NEW EQUIPMENT

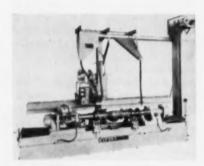
New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 125 or 126

Shielded-arc welder for circular welds

Designed for producing circular welds on large round assemblies up to 13-ft long, a general-purpose, semi-automatic shielded-arc welding machine has a 19-ft bed. Fixtures have a motor-driven headstock, tailstock with live centers, rest blocks for supporting parts during loading and roller steady

rests that support parts during welding. Air cylinders control axial motion of both head and tail-stocks. Conventional submerged arc welding equipment is mounted on ways and a mechanical-type flux recovery unit and preheating units are also provided. Expert Welding Machine Co.

For more data circle No. 36 on postcard, p. 125.





Toolroom lathes have 12 speeds

Model LE "Tray-Top" toolroom lathes in 10, 12½, 15 and 18-in. sizes have 12 spindle speeds in geometric progression, with a 3-lever, color-match, direct-reading shift mechanism to simplify proper selection. Spindle, with long taper key drive nose, is rigidly mounted in three precision antifriction bear-

ings. All headstock bearings are pressure - lubricated. Forty-eight different thread and feed changes are made available through a totally enclosed, automatically-lubricated quick change gear box on the machine. Cincinnati Lathe & Tool Co.

For more data circle No. 37 on postcard, p. 125.

Milling accessories assure accurate indexing

Means for milling parts requiring accurate indexing around a circle are provided in two new plain and universal 10-in. dividing heads, which make possible milling operations on spline shafts, spur and helical gears, and multisided tools or parts like tapered reamers. Both heads are equipped with No.

10 B&S taper spindle, and have an index ratio of 40:1. The universal head is also equipped with a spiral driving mechanism. It will provide leads from 0.670 to 80.625-in. and all divisions to 50 and all even divisions to 94, plus others. Greaves Machine Tool Div., J. A. Fay & Egan Co.

For more data circle No. 38 on postcard, p. 125.



Automatic degreaser for production cleaning

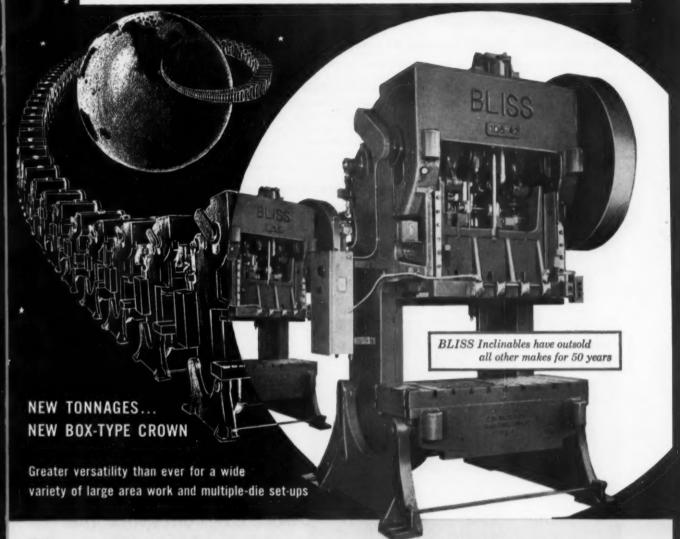
A new, mechanically-agitated degreaser, Model PW1000, has a capacity of 1000-lb and is designed for production cleaning from small parts to large dies. The 60 x 35-in. work platform moves up and down through the cleaning compound at the rate of 38 complete strokes per minute, forcing the compound into all crevices and tapped holes to flush out dirt, grease and metal

chips. The Model PW1000 can be used as a cold solvent cleaner or is available heated by gas, electricity or steam for use with detergents and water. All heating apparatus is mounted in a removable clean-out door. Mechanical agitation is powered by a 3 hp motor. The Klear-Flo Co.

For more data circle No. 39 on postcard, p. 125. Turn Page

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DOUBLE-CRANK INCLINABLE SERIES



When you need a wide die area, this is the press to handle tough blanking, forming, drawing, perforating.

Add a Bliss pneumatic cushion (the press is set up to receive it) and you extend the range of draw work.

For high production work, the addition of a Bliss feed (single or double roll, dial) will give you runs of 200 or more strokes per minute.

Improvements Add New Standards of Accuracy

- •New, Heavy Box-Type Crown—the same as is used on rugged Bliss automotive presses—adds mass, rigidity ...minimizes deflection. Gives 100% up-snug bearing support. Adds strength through entire cast Mechanite gap frame. Keeps slide in perfect alignment even under unusual off-center loads.
- Air Friction Clutch and Brake—cool-running. Automatically adjusts for wear, making for fast action between full brake and engagement at

all times. Friction plates easily replaceable without tearing down clutch.

- Other Features—Precision gibbing, roller bearings, extra-heavy ball-seat connections, heavy-duty forged shaft.
- All Parts Available from Stock—Parts are interchangeable and available from stock through any Bliss sales office.
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Shaper-planer provides three cutting ranges

Equipped with a new hydraulic triple circuit which provides a flexibility of cutting force and speed, a new Heavy Duty Openside shaper-planer is manufactured in several sizes. Three distinct cutting ranges are provided including high speeds for low cutting force, medium speeds for medium cutting force and low speeds for heavy cutting force. Infinite speeds range from 10 to 300 fpm, with maximum return speed regardless of cutting speed. Rockford Machine Tool Co. For more data circle No. 40 on postcard, p. 125.

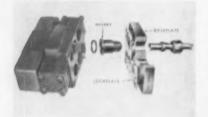
Rollover loader speeds transfer of parts

New NesTier rollover loader is designed to speed and simplify the transfer of small parts from shipping boxes or kegs to easily handled in-plant containers. The unit eliminates costly manual operations, reduces loss or damage to parts. facilitates inventory control and promotes a clean, orderly plant. A full box with lid removed is slid into the loader which rotates on pivot trunnions causing parts to flow into pouring spout. A control lever permits measured flow of parts into tote boxes, bins. etc. Chas. Wm. Doepke Mfg. Co., Inc. For more data circle No. 41 on postcard, p. 125.



Threadless subplate for gasket mounted valves

A threadless subplate for gasket mounted hydraulic valves eliminates pipe threads in both body of valve or in subplates. It is trade named the Hupp Threadless Subplate. Hydraulic valves for gasket mounting have fluid ports in one face of the valve body. The face is flat so that it can be bolted against the subplate, having registered fluid ports. An O-ring seal at each port between the valve body and the subplate seals the hydraulic fluid against leakage. Baseplates are cast iron. Petch Mfg. Co. For more data circle No. 42 on postcard, p. 125.



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Designed, developed and constructed for maximum versatility, MAY-FRAN conveyor components now provide users with the ultimate of flexibility. Pre-fabricated conveyor sections can be furnished rapidly and inexpensively. Sections can be assembled to form virtually any type of hinged-steel belt conveyor for handling stampings, formed metal parts, forgings, automotive scrap, chips and turnings and many other miscellaneous products. Straight sections . . . concave or convex curved

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Cleveland 12, Ohio

Bench-mounted marker for intermittent duty

Designed for the plant requiring intermittent, light-duty general-purpose marking, the Model 27 bench-mounted marking machine uses either roller dies for marking flat parts or flat-roll dies for marking round parts. Manually operated, it will indent one line of characters ½-in. or smaller on parts of suitable size, shape and

workability. It is also available with flat-roll holders or mortised roller dies for quick interchangeable marking with Matthews steel tape. Special holding fixtures can be furnished, so that the part is kept under perfect control during the marking operation. Jas. H. Matthews & Co.

For more data circle No. 43 on postcard, p. 125.



Scanning spectrometer for nondestructive analysis

Completely nondestructive analysis by x-ray fluorescence, with accuracy equal to the best chemical methods and speed comparable to direct-reading optical emission procedures, is said to be possible with the new ARL X-ray scanning spectrometer. All forms of materials may be analyzed, whether liquids, solids or powders, and all except the lighter elements in the periodic table can be accurately and easily determined. Though recent in conception, X-ray methods have already proved their value in many industries. Limits of detectability,

depending upon the matrix and the particular element being determined, lie between one part per million and 100 parts per million. Every feature of importance to X-ray fluorescence spectroscopy has been incorporated in the X-ray scanning spectrometer. The instrument has been designed to provide the utmost in sensitivity and precision for research or production control applications. Applied Research Laboratories.

For more data circle No. 44 on postcard, p. 125. Turn Page



PRECISION-GROUND



MACHINE TOOLS

Free Catalog!

For complete details on Frauenthal 1800 Series Double Head Grinders, write for catalog.

Frauenthal Division

COMPONENTS . . .

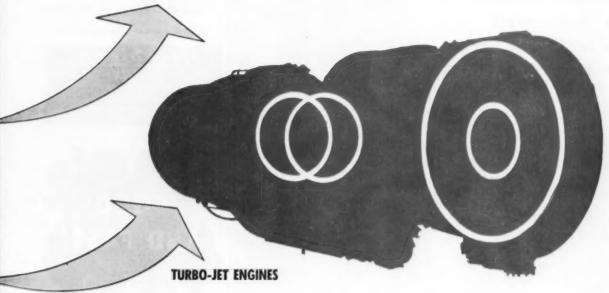


WHATEVER YOUR FIELD OF INDUSTRY — With Frauenthal precision machines, you're able to grind diameters and related surfaces without changing setup of the workpiece and obtain accuracies within .000200". This assures consistently uniform precision in concentricity, parallelism and roundness.

The accuracy and versatility of Frauenthal equipment is unequalled in the machine tool field, Difficult work-pieces — those impossible to handle on conventional horizontal grinding equipment — are handled with comparative ease on these unusual machines.

Four different series of machines are available affording table sizes up to 140". The 1800 Series Double Head Precision grinder, illustrated at left, is now available with a maximum swing of 72" and various table sizes to suit customer specifications.

For complete details, contact Frauenthal of Muskegon, Michigan.



MACHINE TOOLS — Modern day machine tools are required to produce piece parts to greater accuracy than ever before. Therefore, machine tool components must be more precise to the nth degree. With Frauenthal grinders you can grind collets, chucks, spindle sleeves and similar components under simulated assembly conditions to assure concentricity, parallelism and roundness. Eliminate costly and time consuming hand scraping and grind plated parts prior to and after plating for increased wearability.

TURBO-JET ENGINES — Diffuser cases, rotors, compressor discs, vanes, etc., are components of jet engines ground on

Frauenthal equipment. Thin section parts, which are unstable due to their design, are ground on the horizontal rotary table of the 1800 and 3100 Series machines. The compound and spindle angle setting features permit the grinding of surfaces normally inaccessible on conventional equipment.

ORDNANCE — Large bearings and housing components for ordnance applications are ground on the 1800 and 2200 Series grinders. Applications vary from aircraft gun turret bearings to the large turret bearings required for tanks, motorized gun carriages, radar and naval gun mounts.

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MUSKEGON, MICHIGAN



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* *. *

Stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.



NEW EQUIPMENT

Atmosphere controller

A new automatic carbon-potential control instrument for controlledatmosphere heat treating provides a simple, economical means for



automatically regulating dewpoint, and hence, carbon potential. It is applicable to such processes as gas carburizing, clean hardening, etc., where a permanent record is not required. Signal lights give high and low dewpoint indication. Surface Combustion Corp.

For more data circle No. 45 on postcard, p. 125.

Line filter

A 2-in. line filter is said to remove all pipe scale, rust, dirt and 98 pct of the free moisture in compressed air or gases used for operating pneumatic devices or machinery. Compressed air entering the filter passes through a baffle system which sets up a centrifugal action in the filter bowl. Foreign particles are thrown against the side of the bowl and are directed to the quiet zone at the bottom of the reservoir where they are deposited for easy removal. Centrifugally cleaned air in the center of this vortex is further cleaned by being forced through five porous bronze filtering elements. Constructed of corrosion resistant materials, the filter has a working pressure of 150 psi, and weighs 45 lb. Arrow Tools, Inc.

For more data circle No. 46 on postcard, p. 125.





with National Metal Chip handling and Oil reclamation systems . . . for over 25 years leaders in the field.

Write for National's Free Bulletin I-55

National CONVEYORS COMPANY, INC.

Fairview, Bergen County, N. J.

Manufacturers of Ash Conveyor Systems and Pneumatic Systems for handling granular materials



That's how a rivet fastens - and that's what Milford service is-from 5 Milford plants and 20 Milford

offices. Try us and see for yourself - soon!

RIVET & MACHINE CO.

Plants: Milford, Conn.; Norwalk, Calif.; Elyria, Ohlo; Aurora, III.; Hatboro, Pa. Offices: Atlanta, Chicago, Cleveland, Detroit, Fort Worth, Indianapolis, Newark, New York, Pittsburgh, Racine, St. Louis, St. Paul, San Francisco, Seattle; Norwalk, Calif.; Stratford, Conn.; Charlotte, N. C.; Seneca Falis, N.Y.; Jenkintown, Pa.; Wastwood, Mass.

Headquarters for RIVETS and Rivet-setting Machines

NEW EQUIPMENT

Press brakes

Four new series of press brakes for bending and forming sheet metal and steel plate are announced.



All steel and of welded frame construction, the presses have a deep section bed and ram of rolled steel plate to assure permanent alignment and minimum deflection under load. Many optional features for these press brake equipments are available if needed. Dreis & Krump.

For more data circle No. 47 on postcard, p. 125.

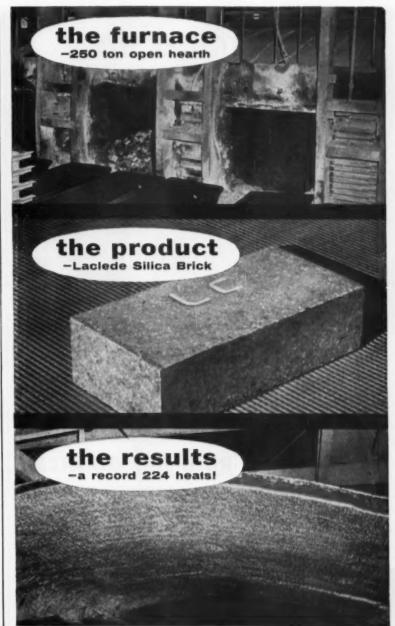
Polyphase motors

Fully protected for use indoors or out, these motors are built of quality materials and incorporate all the important features demanded of motors for general-purpose use. Stator core laminations are manufactured by punching



from annealed, non-aging electric sheet steel, carefully weighed to assure the right amount. Windings are securely wedged in position, thoroughly impregnated with special insulating varnish, and baked under carefully controlled temperature conditions. Wagner Electric Corp.

For more data circle No. 48 on postcard, p. 125. Turn Page



LACLEDE-CHRISTY does it again!

What more can you ask? Laclede-Christy Silica Brick completed 224 heats in the roof of a 250 ton open hearth furnace at a leading midwest steel mill. Based on a year's average, Laclede-Christy out-lasted other silica brick by 27 to 67 heats—for an average savings of at least 30%!

Is this the kind of refractory service you're looking for? Your source of supply—Laclede-Christy—is nearby.

LACLEDE-CHRISTY COMPANY



DIVISION OF H. K. PORTER COMPANY, INC. 2000 Humpton Avenue * St. Louis 10, Missouri Mission 7-2400





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That's the price of this 5-Ton HANNIFIN Press*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

WRITE. Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

1809-1823 Reading Road



Cincinnati 2, Ohlo

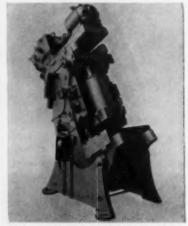
HANNIFIN

Hannifin Corporation, 513 S. Wolf Road, Des Plaines, Illinois



Die tryout press

New hydraulic press developed for die tryout and pilot production runs combines the best features of hydraulic action and gap frame construction. A feature of the hydraulic action on the press is its precise control over inching, which permits close observation of die



action. Full tonnage is available at any point in the stroke. Stroke is longer than for standard Bliss inclinable presses and compensates for die space and press setup adjustment, which facilitates die tryouts and pilot runs. Models are available in 50 to 250-tons capacities. E. W. Bliss Co.

For more data circle No. 49 on postcard, p. 125.

Self-wrenching locknut

A new self-wrenching locknut designed for greater fatigue strength and less weight is for application wherever a removable self-wrenching nut is required. A lug on the ESNA type N2603 nut prevents it from rotating during wrenching of the bolt by bracing itself against



an adjoining surface. Both lug and nut are steel with a cadmium-plated finish. A red nylon insert in the nut provides the locking feature. Elastic Stop Nut Corp. of America. For more data circle No. 50 on postcard, p. 123.

NEW EQUIPMENT

Optical tap checker

Rapid and accurate quantity inspection of taps of any given size is possible with a new optical tap checker. It is offered as a standardized inspection technique acceptable to the tap manufacturing

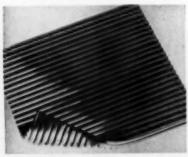


industry, as well as to meet the needs of the tap consumer. The tap checker measures the angle formed by a line from the physical crest to the physical root of the thread on the tap, and a radial line to the physical crest of the thread. Hanson-Whitney Co.

For more data circle No. 51 on postcard, p. 125.

Anti-vibration pads

Effective isolation of vibration in both high and low loading ranges is claimed for neoprene vibration isolation pads manufactured with alternate high and low ribs. Called Shear-Flex, the new pads support light loads on high ribs only, heavier loads on entire ribbed surface.



Pads require no bolting or cementing. They have a maximum capacity of 60 psi. Vibration Mountings, Inc.

For more data circle No. 52 on postcard, p. 125. Turn Page



Ahead Where?

You will see more and more of VULCAN Tool Steels in the near future. They are coming closer through VULCAN's "forward motion," including expanded district office and warehouse outlets.

Thus you will gain access to the special advantages VULCAN Tool Steels offer—to help you produce your finest tools and dies.

VULCAN offers only the finest tool steels—forged to assure highest quality.

VULCAN's moderate size and specialization give you close attention to your exact needs. Service is efficient and prompt.

VULCAN Tool Steels are available in all types, shapes and sizes. See your VULCAN representative, or write for VULCAN Tool Steel Data.



H. K. PORTER COMPANY, INC.

Aliquippa, Pennsylvania

Offices in Pittsburgh, New York, Baltimore, Boston, Chicago, Birmingham, Milwaukee, St. Leuis, Lansing

Walkie truck designed for handling cable reels

The new walkie truck can handle reels weighing up to 10,000 lb, diameters ranging from 90 in. down to 36 in. with no manual adjustment of the lifting hooks. Maximum reel width is 68 in. Twin hydraulic cylinders, one attached to each lifting arm, are synchronized so that they lift together. Lifting and lowering controls, as well

as brake, traction, direction and horn, are located conveniently in the handle head. For easy maneuverability, the truck operates with handle in any position, including vertical. Storage battery power gives controlled walking speed, whether truck is empty or loaded. Lewis-Shepard Products, Inc.

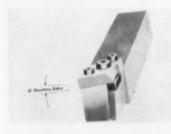
For more data circle No. 53 on postcard, p. 125.

New 6° positive-rake toolholder has chip-breaker plate

This toolholder was designed for machining metals and materials requiring the use of a positive rake tool design, such as aluminum, copper, bronze, stainless, and many plastics. A new cast-alloy chipbreaker with high resistance to

abrasive wear is also provided. The new plate eliminates the need for grinding chip-breakers in the cemented carbide insert and can be had in two styles. Vascoloy-Ramet Corp.

For more data circle No. 54 on postcard, p. 125.



Elevating conveyors

Latest Feedal unit is designed to transfer parts from one operating machine to another. It accepts the parts from the discharge chute of the first machine, elevates and synchronizes them for delivery to the next machine. Since both machines are set to operate at the same sized rate of speed the Feedal unit operates at the same rate of delivery. Series 4500 conveyors handle cylindrical parts up to 31/2 in. diam x 11/2 in. thick. Power is furnished by a 1/4 hp 220/440 v motor through a variable speed drive. Feedall, Inc.

For more data circle No. 55 on postcard, p. 125.



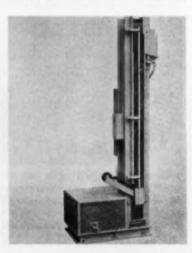
That's right! Hendrick serves every one of the 21 basic industries designated by the U. S. Department of Commerce under its Standard Industrial Classification list. If you have a perforating problem and are not already familiar with Hendrick's facilities, we stand ready to serve you, too! Whatever your needs be, if you wish to perforate metal, rubber, plastic or masonite for a screening, straining, decorative, display or acoustical application, Hendrick's long experience can be of real help. Join the long list of manufacturers who now derive untold assembling and selling benefits by using Hendrick Perforated Metal as a fabrication material. Call Hendrick today.

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Nobur Tools are used on any lathe, drill press, portable drill or flexible shaft. Operation of the double-edge cutting blade is easy and safe...no skilled help is required, and the spindle never needs to be stopped for either de-burring or chamfering.

Nobur Tools cut freely an either hard or soft metals, are simple in construction and are made in sizes to cover a full range of hole diameters. *NEW "DS" SERIES extends range of NOBUR applications to holes as small as 1/8" diameter. WRITE FOR FULL DITALLS TODAY!



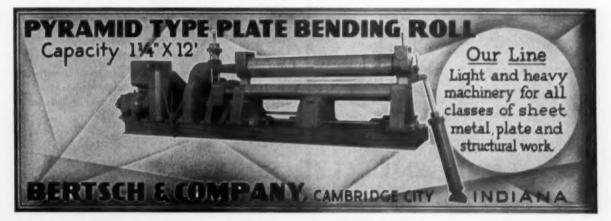


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WORCESTER STAMPED METAL CO.

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improve a product...

diesel engine water pump impeller forged of



Formerly produced as sand castings, these impellers now give better results because they're forged from "603" high strength bronze by the Mueller Brass Co. Said to be "right for the job and far superior to the old cast impellers", these forgings bring greater efficiency and longer life to the diesel engine water pumps in which they are installed. This tough "600" series alloy is readily forgeable, possesses remarkable resistance to corrosion, and has fine bearing qualities. Uniformity is excellent, due to the closer dimensional control of the forging process, and surface finish is noticeably smoother. This is another case where Mueller Brass Co. forgings have greatly improved a product . . . why not let our engineers show you the many advantages of using forgings.



MUELLER BRASS CO.

PORT HURON 24, MICHIGAN



The Iron Age SUMMARY . . .

Steel customers going all out to fill their requirements . . . Mills pushing facilities but face maintenance, other problems . . . Scrap worry.

Working The Angles . . . Steel consumers are working all the angles to get what they need from the mills. The pressure is on all over the country. It comes from big and small consumers.

Purchasing agents are hiking up their trousers and hitting the road to mill offices. Personal friendships and mutual contacts are being used to the hilt. The pressure extends to warehouses as well.

Steel producers are going through their worst agonies in their efforts to get off the hook. Some are pushing furnaces and rolling mills beyond rated capacities. The national ingot rate is flirting with the 100-pct mark.

But despite the all-out push for production, consumer inventories generally are dropping. Even big companies are having a hard time placing orders. And there are danger signs ahead.

Watch Scrap... For one thing, maintenance problems are bound to grow. Blast furnaces, openhearths, and other facilities are groaning under the strain. The problem will worsen as the winter months approach.

Another possible danger is scrap. Mills have

been using blast furnaces to the limit both to improve production from openhearths and to conserve scrap. This also helps to keep scrap prices within reason.

Scrap historically becomes harder to get in cold weather. Collection machinery slows up. Transport becomes a problem. Scrap exports also are worrisome. Commerce Dept. scrap export restrictions are relatively mild, and foreign demand is strong.

An early close of the Lake shipping season this year, or a late start next year, both depending on weather, conceivably could put a heavy strain on iron ore supplies next spring. In such an event, scrap would have to fill the gap.

Mills Scramble, Too . . . The mills themselves are up against a steel procurement problem. They're trying to expand capacity to handle present and anticipated demand. But for each 10 tons of new capacity, about 2.5 tons is needed to build it. As times goes on this ratio will increase because of the widespread requirements—from ore to finishing mills. Some mills are trading steel with other mills to keep construction projects going.

Steel production this week is scheduled at 97 pct of capacity, up one-half point.

Steel Output Operating Rates

Production	This Week	Last	Month Ago	Year Ago
(Net tons, 000 omitted)	2,341	2,328	2,316	1,786
Ingot Index				
(1947-1949=100)	145.5	145.0	144.0	111.0
Operating Rates				
Chicago	96.5	96.5*	96.0	78.5
Pittsburgh	102.0	101.0*	99.0	71.0
Philadelphia	101.0	98.0*	97.0	64.0
Valley	99.0	97.0*	95.0	69.0
West	73.5	75.0	95.0	77.5
Detroit	98.0	98.0*	92.0	94.0
Buffalo	105.0	105.0	102.0	75.5
Cleveland	103.0	105.0*	102.0	71.0
Birmingham	97.5	97.5	96.0	74.0
S. Ohio River	86.5	89.0*	82.0	88.0
Wheeling	102.0	103.0*	101.0	88.0
St. Louis	106.0	106.0*	92.0	76.5
Northeast	97.0	83.0*	95.0	48.0
Aggregate	97.0	96.5	96.0	74.0

Prices At A Glance

cents per lb unless otherwise	noted)			
	This	Week	Month	Year
	Week	Ago	Ago	Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.798
Pig Iron (Gross Ton)	\$59.09	\$59.09	\$59.09	\$56.59
Scrap, No. 1 hvy				
(gross ton)	\$44.83	\$44.83	\$44.17	\$33.00
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	22.20
Copper, electrolytic	43.00	43.00	43.00	30.00
Lead, St. Louis	15.30	15.30	14.80	14.80
Magnesium, ingot	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	63.08
Tin, Straits, N. Y.	96.125	96.25	97.00	92.875
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

*Revised

STEEL PRODUCT MARKETS

Mills Set Records

September, three-quarter production rates hit new highs . . . First nine months of 1955 eight days short of entire 1954 output . . . Market still strong.

◆ LATEST PRODUCTION figures from the American Iron and Steel Institute indicate that the steel companies are really straining to take the pressure off.

Output for the month of September 1955 was the highest for any September on record; 9.881 million tons of ingots and steel for castings were produced. This compares favorably with the 9,594,545 net tons turned out in August and 6,807,483 net tons for the comparable month in 1954.

Total output for the first nine months of the year also pushed to a new high for that period. A total of 85,782,793 net tons was poured by the steelmaking furnaces for the initial three-quarters of 1955, better than 270,000 tons more than during the previous record period in 1953. American Iron and Steel Institute estimates that this was within eight days of equaling the entire 1954 output of 88.3 million tons. Only 64,233,619 tons were poured during this period last year.

To set these records the mills operated at 95.7 pct of rated capacity during September and an average of 91.1 pct for the entire nine month stretch.

Even with all this activity and record production, the market is still just about as strong as it was several months ago. Demand for sheet and strip is stronger than ever. Some sections report highly aggravated bar markets while others simply report "tight as ever." Indication of an increase in building has tightened up structurals. Railroads are still pushing for more plate.

The steel mills rate an "A" for effort but indications are that they will have to go on setting records for several quarters before they will be able to dent the market.

SHEETS AND STRIP . . . Still no letup, Detroit reports, and these sentiments are heartily echoed in all sections. Pittsburgh reports mills are several months behind in deliveries and are very cautious to the point of taking practically no orders for the first quarter of 1956 until the end of the month. A large consumer of sheet and enameling iron in Chicago is setting aside most of next week for trips to the mills in an attempt to expedite orders. However, it is doubtful that he will meet with any success, since several of the mills have indicated that tonnage on the order books for December has been pushed back to late January. Subsequent orders may be further extended. Carryovers are expected to be unusually large in all markets.

BARS... Several Midwestern mills report bar deliveries running about four weeks in arrears. This is also the case in other sections. Mills don't look for any particular improvement until possibly the second quarter of 1956. But on the other hand, they are fairly confident that they can maintain the current delivery pace. Detroit reports that the carbon bar situation is getting tighter because of increased concentration on alloy bar production. Carryovers into the first quarter of 1956 here are going to be very heavy.

Purchasing Agent's Checklist:

BUSINESS: The 1956 Outlook p. 63
WAREHOUSES: Why inventories are
low p. 66

AUTOMOTIVE: How independents fight to hold market p. 80

WEST COAST: Big market in electronics p. 69

PLATES . . . West Coast warehouseman reports on the plate situation: "Plate has ceased to be rough to get-it's now simply non-existent." Cleveland also reports a strangling market with none rolling in despite heavy railroad demand. Railroads are reported to be the main customers in Pittsburgh and Chicago. Despite the fact that all possible pressure is being exerted, deliveries are still running eight to twelve weeks behind in these markets. The only break in the entire plate market comes from Chicago, where a large fabricator working on a storage tank construction contract explained that he was receiving delivery of wide plate only four to six weeks late. But he expects the situation to get worse.

STRUCTURALS . . . Indications of an increase in building activity has tightened the structural market, especially in wide flange beams. Standard and carbuilding sections are also reported strong in Chicago. Deliveries are running eight to nine weeks behind with no sign of immediate relief.

WIRE PRODUCTS . . . A major Chicago mill reports a full order book running well into the first quarter of 1956 on manufacturers' wire items such as spring wire, cold-heading wire and hot rolled rods. Indications from the automakers are that the current most critical item, spring wire, will continue to hold this dubious distinction at least well into the second quarter of 1956. Cleveland reports that the agricultural demand for merchants' wire is beginning to pick up as farmers turn their attention to post harvest fence mending. However, there is as yet no pressure to speak of.

TUBULAR PRODUCTS... Pittsburgh and Chicago report welded pipe deliveries in excellent condition. It is still possible to get fourth quarter deliveries with tonnages available for November and December. Chicago also reports small diameter mechanical and pressure tubing in good shape at both mill and warehouse level. Deliveries are running only a week or two behind. Seamless is tight with deliveries about six weeks behind with a month of carryover into 1956 expected.

FASTENERS . . . Cleveland reports demand for light fasteners is booming with deliveries six to seven weeks late not uncommon. Business is not quite as brisk for heavy fasteners with the main demand for track bolts, mine and roof bolts.

Comparison of Prices

Oct. 11 1955

\$65.69

59.00 62.93 55.00 59.00 62.77 58.50

59,00

9.50¢

Oct. 18

262.69 59.00 62.93 85.00 59.00 62.77 58.50

59.00

(Effective Oct. 18, 1955)

Sept. 20 1955

\$63.69

59.00 62.93 55.00 59.00 62.77 58.50

59.00

9.500

Oct. 19

1954

\$61.19

56.00

56,50

9.50%

30.00 92.875 11.50 14.80 22.20 63.08 27.75 28.50

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittaburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in Italics.

ectines appear in Italics.				
No. B. H. L. Co. L. Co.	Oct. 18 1955	Oct. 11 1955	Sept. 20 1951	Oct. 19 1954
'lat-Rolled Steel: (per pound) Hot-rolled sheets	4.325€	4.325€	4.325€	4.05¢
Cold milled about				
Cold-rolled sheets	5.325	8.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	8.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.82
Plate	4.52	4.52	4.52	4.225
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50
fin and Terneplate: (per base bo:	K)			
Tinplate (1.50 lb.) cokes	\$9.05	39.05	\$9.05	\$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30d
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Structural anapea	38.25	38.25	88.25	35.50
Stainless bars (No. 302)				
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25€	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	\$4,725	84.725	\$4.725	\$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	\$68,50	\$68.50	\$68.50	\$64.00
Slabs, rerolling	68,50	68,50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound	,			
Wire rods	5.025¢	5.025€	5,025€	4,675
Skelp	4.225	4.225	4.225	3.90
Pinished Steel Composite: (per po	nundi			

Finished Steel Composite
Weighted index based on steel bars, shapes,
plates, wire, rails, black pipe, hot and cold
rolled sheeta and strips.

Pig Iron Composite
Based on averages for basic iron at Vailey
furnaces and foundry iron at Chicago, Philadelphia, Buffaio, Valley and Birmingham.

Pig Iron: (per gross ton)
Foundry, del'd Phila.
Foundry, Valley
Foundry, Southern, Cin'ti
Foundry, Birmingham
Foundry, Chicago
Basic, del'd Philadelphia
Basic, Valley furnace
Malleable, Valley furnace
Malleable, Valley
Ferromanganeset, cents per lb.
‡ 74-76 pet Mn base. \$59.09 \$59.09 \$56.59 Scrap: (per gross ton)
No. 1 steel, Pittsburgh
No. 1 steel, Phila. area
No. 1 steel, Chicago
No. 1 bundles, Detroit
Low phos., Youngstown
No. 1 mach'y cast, Pittsburgh
No. 1 mach'y cast, Philadel's
No. 1 mach'y cast, Chicago
No. 1 mach'y cast, Chicago 46.50 45.50 43.60 39.00 49.00 48.50 47.50 46.50 41.50 39.00 47.50 46.50 47.50 52.50 46.50 43.50 39.00 49.00 47.50 31.00 33,50 26,50 35,50 42,50 42,50 43,50 63.50 63.50 Steel Scrap Composite: (per gross ton)
No. 1 heavy melting scrap ... \$44.88 844.83 223.00 Coke, Connellsville: (per net ton at oven) Furnace coke, prompt \$13.25 Foundry coke, prompt 16.25 Nonferrous Metals: (cents per pound Copper, electrolytic, Conn. 43.6 Copper, Lake, Conn. 43.6 Tin, Straits, New York 96.1 Zinc, East St. Louis 13.1 Lead, St. Louis 15.4 Luminum, virgin ingot 24.6 Nickel, electrolytic 64.1 Magnesium, ingot 33.1 Antimony, Laredo, Tex. 33.1 Tentative. \$ Average. * Revised. to large buyers) 43.00 43.00 43.00

96.125† 13.25† 15.30 24.40 64.50 33.25 33.00

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap
delivered to consumers at Pittsburgh, Philadelphia and Chicago.

18.00 15.30 24.40 64.50 33.25 38.00

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

Base price cents per lb. f.e.b. mill

43.00

97.00

97.00 13.00 14.80 24.40 64.50 33.25 33.00

←To identify producers, see Key on P. 172->

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem Bi	60.50	61.00	61.50	62.60	
Birdsboro, Pa. B6	60.50	61.00	61.56	62.60	
Birmingham R3	54.50	55.00*			
Birmingham W9	54.58	55.00°	58.00		
Birmingham U4.	54.50	55.00°	59.00		
Buffals R3	58.50	59.00	59.50		
Buffalo HI	58.50	59.08	59.50		
Buffala Ho	58.50	59.08	59.50	60.00	
Chester C/7	54.50	55.mm	55.50		
Chicago 14	58.50	59.00	59.86	59.50	
Cleveland A5	58.50	59.66	59.00	59.50	63.56
Cleveland R3	58.50	59.00	59.00		
Daingerfield L3	55.00	55.00	55.00		
Duluth 14	58.50	59.00	59.66	59.50	
Erie 14	58.50	59.00	59.00	59.50	
Everett M6		61.00	61.50		
Fentana K1	64.50	65.00			
Geneva, Utah C7	58.50	59.00	******		
Granite City G2	60.40	60.90	61.40		
Hubbard YI			59.00		
Lane Star L3		55.00			
Minnegus C6	60.50	61.00	61.50		
Manessen P6	58.50		41.0000		- head
Neville Is. P4	58.58	50.00	59.00		
N. Tonawanda T/		59.00	59.50		
Pittsburgh UI	58.50			59.50	
Sharpaville S3	58,50	59.00	59.60	59.50	
So. Chicago R3	58.50		59.00		
Steelton B3	60.50	61.00	61.50	62.00	66.5
Swedeland A2		61.00	61.50	62.00	
Toledo 14	58.50	59.00	59.00	59.50	
Troy. N. Y. R3.	60.50	61.00	61.50	62.00	66.5
Youngstown Y/			59.00	59.50	

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicen over base (1.75 to 2.25 pct except low phos., 1.75 to 2.80 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, 32 per ton for 0.5 to 0.75 pct nickel, 31 for each additional, 0.25 pct nickel. "Add \$1.00 for 0.31-0.69 pct phos.

Silvery Iran: Buffalo, H1, \$48.75; Jackson, J1, G1, \$47.50. Add \$1.00 per ion for each 0.50 pct silicon over hase (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganuse over 1.0 pct. Bossemor ferrosilicon prices are \$1 over comparable silvery iron.

Product	301	302	303	364	316	321	348	410	416	430
Ingots, recelling	17.75	19.00	-	26.25	31.50	25.00	33.75	15.00	_	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	-	19.75
Forg. diaes, die blocks, rings	-	-	-	-	-	-	-	-	~	-
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.60
Bars, wices, structurals	35.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	33.00	32.25
Sheets	44.25	44.50	-	47.25	68,25	54.25	73.50	36.25	-	36.75
Strip, hot-rolled	32.00	34.50	-	37.25	58.25	44.25	50.75		-	
Strip, cald-rolled	41.00	44.50	-	47.25	68.25	54.25	73.50	36.25	-	36.75

STAINLESS STEFL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W1, J2; altimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U7; New Castle, Ind., 12; Ft. Wayne, J4; Baltimore, E1; M Philadelphia, D5.

Strip: Midland, Pa., CII; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., FI; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Brid geville, Pa., U2; Detreit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Fiarrison, N. J., D3; Youngstown, C5; Sharon, Pa., SI; Butler, Pa., A7; Wallingford, Conn., U3 (25¢ per lb higher); W1 (25¢ per lb higher); New Bedlord, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., 1; McKeepport, Pa., U1; F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., U1; Watervillet, N. Y., A3; Waukegan, A3; Canton, O., T5; F2; Wayne, U4; Philadelphia, D5; Detroit, R5.

Wire: Waukogan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dankirk, A3; Monessen, F1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicage, UI; Munhall, Pa., UI; Midland, Pa., CII; New Castle, Ind., I2; Middletown, A7; Washington, Pa., I2; Cleveland, Massillon, R3; Coaterville, Pa., CI5; Philadelphia, D5.

Forged discs, die blocks, rings: Pittsburgh, CII; Syracuss, CII; Ferndale, Mich., A3; Washington, Pa., J2.

Forgings billets: Midland, Pa., CII; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervlist, A3; Pittsburgh, Chicago, U1; Syracuse, CII; Detroit, R5.

Spotty Action Clouds Market

Chicago reports scattered price losses, slight easing at dealer level . . . Prices generally firm in the East and Pittsburgh . . . Birmingham prices up.

◆ SCRAP MARKET has an unsettled look this week. Prices are moving up and down. Reports of strength and weakness come in.

Chicago, which has shown good strength in recent weeks, continued strong, although brokers report a better flow of scrap from dealers at prices consistent with delivered-to-mill quotations. Earlier, some brokers had been forced to pay as much as they were charging the mills, for at least part of their commitments.

Pittsburgh traffic continues to drag. In the East, prices held firm. Domestic buying continues at a steady clip in this area with export always bolstering the market. Two ships have been loaded at Philadelphia this month; more are expected in.

Elsewhere, prices held or advanced. Boston reported broad gains. In Birmingham, steelmaking grades moved up \$1. Youngstown, Cincinnati and Detroit prices are unchanged.

THE IRON AGE Composite for No. 1 heavy melting remains \$44.83.

Pittsburgh . . . The market continues in the doldrums. Mills are holding off on purchases of primary open hearth grades. Scrap rails are up \$2, \$1 corrected from last week plus an additional \$1 as a reflection of the most recent RR list. No. 1 machinery cast and heavy breakable cast advanced another dollar on the basis of latest sales. Blast furnace grades continued to move at current levels. Heavy turnings remain at last week's level, \$42 to \$43.

Chicago . . . Mill buyers in the Chicago area are sitting tight, hopeful that the market might be tending toward softness. But it was a forlorn

hope at best. Only change in the situation is that brokers report they are now able to buy plenty of scrap in line with delivered prices for openhearth grades. Several weeks ago they were forced to buy some of their tonnage at the same price or better than they were charging their customers. Offers of turnings at \$28 and \$30 have been reported. A price offer by a consumer of \$48 for No. 1 RR, and \$48 for electric furnace was reported. Prices continued to hold firm despite talk of a softening, although absence of strong mill buying has the market in a jittery mood.

Philadelphia . . . Price action is confined to No. 2 bundles, malleable and railroad specialties. Bundles were off \$1 on the purchase of leading area mill. Movement does not reflect any weakening of market. In general, scrap is strong at going figures. Cast grades continue to show particular health, with malleable moving up \$1. Railroad specialties advanced \$1. Export continues a steady clip and stands ready to take up any slack in the domestic market. A ship loading right now is the second to take scrap from Philadelphia this month.

Detroit . . . Business is still at a standstill in the Detroit area. No new buying, either locally or outside, has been reported. Local mills are not inclined to build inventories because of the high prices. Sentiment in the area is that the market could jump either way soon with blast furnace scrap leading the parade.

New York . . . Prices at press time are unchanged in a firm and strengthening market. Brokers say all is moving steadily and quietly, but some dealers claim brokers are pressing them particularly to fulfill export commitments. If this continues, a price rise in the near future seems in the cards.

Cleveland... Good foundry buying boosted short rails \$3 to \$4 last week in an otherwise slow market. One customer paid \$61 and a second railroad got over \$61 on sale. Brokers and dealers are also finding a ready market for this item. Cut structural and plate price also went up 50¢ on basis of sale to major local foundry consumer. On steelmaking grades one local mill bought tonnage of No. 2 bundles at quoted levels of \$37.

Birmingham . . . Back in the market again, the largest buyer of steel scrap in the district raised its prices for No. 1 and No. 2 heavy melting, but left prices for No. 2 bundles unchanged. This increases the spread, but prices for bundles still are good. Specialty items are strong with a demand for plate and structural and electric furnace scrap. A good flow of scrap is moving into dealers' yards but inventories continue low because much of it is sold before it is received. The cast market is firm at present prices.

St. Louis . . . Price increases by district mills stimulated the movement of scrap, placing the consumers in a comfortable position. A MOPAC list of 125 carloads closes this week, but prices are expected to be in line with present quotations. Prices are unchanged.

Cincinnati . . . An undertone of weakness crept into local market last week due to noticeable hesitation on part of buyers. Brokers and dealers anxiously await end-of-month factory scrap sales for tip-off on strength of market next month. Local scrap moving well on latest local order and foundry business holding up satisfactorily.

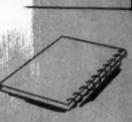
Buffalo... Market here remains on the quiet side. Prices are unchanged. Predicted buying wave has failed to materialize so far.

Boston . . . Export competition forces prices up here. Increases range from 50¢ for No. 1 heavy melting to \$2 for electric furnace. Eastern Pennsylvania mills are buying. Market is running smoothly.

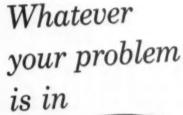
West Coast . . . Prices jacked up for second time this month in all major West Coast markets. Mid-month changes, unusual for this area, reflect mills anxiety over loss of scrap to exporters. Increased prices aren't helping situation — exporting continues very heavy.



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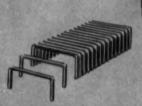


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ADDRESS

Pittsburgh

No. 1 hvy. melting	44.00	to	\$45.00
No. 2 hvy, melting	40.00	to	41.00
No. 1 bundles	44.00	to	45.00
No. 2 bundles	37.00	to	38.00
Machine shop turn,	30.00	to	21.00
Mixed bor, and ms. turns	30.00		31.00
Shoveling turnings	33.00		34.00
Cast iron borings	33.00		34.00
Low phos. punch'gs, plate.	49.00	to	50.00
Heavy turnings	42.00	to	43.00
No. 1 RR, hvy, melting	48.00		49.00
Scrap rails, random igth	52.50	to	53.50
Rails 2 ft and under	56.00		
RR, steel wheels	52.50		
RR. spring steel	52.50		
RR. couplers and knuckles	52.50		
No. 1 machinery cast	49.00		
Cupola cast.	42.00		
Heavy breakable cast	39.00		40.00

Chicago

No. 1 hvy, melting	36,00 46,00 43,00	to to	37.00 47.00 44.00
No. 2 dealers' bundles Machine shop turn Mixed bor. and turn Shoveling turnings	33,00 38,00 30,00 30,00	to to	29,00 31,00 31,00
Cast iron borings Low phos. forge crops Low phos. punch'gs, plate. Low phos. 3 ft and under.	30.00 52.00 49.00 48.00	to to	53.00 50.00 49.00
No. 1 RR. hvy. melting Scrap rails, random lgth Rerolling rails Rails 2 ft and under Locomotive tires, cut	49.00 56.00 66.00 61.00 53.00	to to	57.00 67.00 62.00
Cut bolsters & side frames Angles and splice bars RR. steel car axles RR. couplers and knuckles	54.00 58.00 57.00 52.00	to to	55,00 59,00 58,00
No. 1 machinery cast Cupola cast	53,00 47.00 41.00 39.00	to to	54.00 49.00 42.00
Cast iron car wheels Malleable Stove plate	47.00 58.00 39.00	to	48,00 59.00

Philadelphia Area

No. 1 hvy, melting	46.00 t	0 \$47.00
No. 2 hvy, melting	40.00 t	
No. I bundles	46.00 t	0 47.00
No. 2 bundles	37,00 t	0 38,00
Machine shop turn	38.50 t	0 29,50
Mixed bor, short turn	28.50 t	0 29.50
Cast iron borings	28,50 t	0 29.50
Shoveling turnings	30.00 t	0 21.00
Clean cast chem. borings.	85.00 t	0 36.00
Low phos. 5 ft and under.	48.00 1	
Low phos. 2 ft and under.	49.00 t	
Low phos. punch'gs	49.00 (
Elec. furnace bundles	47.00 1	
Heavy turnings	42.00 (
RR. steel wheels	61.00	
RR. spring steel	51.00 1	
Rails 18 in, and under	\$2.00 t	
Cupola cast,	41.001	
Heavy breakable cast	46,001	
Cast iron car wheels	51,00	
Malleable	58,00	
Unstripped motor blocks	29,00	
No. 1 machinery cast	47,00	to 48,00

Cleveland

No. 1 hvy, melting 1	45.00 1	o \$46.00
No. 2 hvy. melting	39,00 1	0 40.00
No. I bundles	45.00 1	o 46.00
No. 2 bundles	36.00 (0 37.00
No. 1 bushellng	45.00 1	0 46.00
Machine shop turn	25,00 1	0 26.00
Mixed bor, and turn	29.00 1	0 30.00
Shoveling turnings	29,00 1	
Cast fron borings	29.001	
Cut struct'r'l & plates, 2 ft	meres .	
& under	48.50	to 49.50
Drop forge flashings	43,00	
Low phos. punch'gs, plate.	44.00	
Foundry steel, 2 ft & under	47.50	to 48.50
No. 1 RR, heavy melting.	48,50	to 49.50
Rails 2 ft and under	61.00	to 62.00
Rails 18 in. and under	62.00	to 68.00
Railroad grate bars	37.00	to 38.00
Steel axle turnings	30.00	
Railroad cast	49.00	
No. 1 machinery cast	49.00	
Stove plate	45.00	
Malleable	51.00	
341 W. S. S. C.	91.00	00 00.00

Iron and Steel Scrap

Going prices of Iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting		į				. 1	47.50	to	\$48.50
No. 2 hvy. melting							41.00	to	42.00
No. 1 bundles							47,50	to	48.50
No. 2 bundles									
Machine shop turn.			*		ū		25,00	to	26.00
Shoveling turnings		ю					30.00	to	31.00
Cast iron borings .				ì	,		30.00	to	31.00
Low phos. plate							48.50	to	49,50

Buffalo

No. 1 hvy. melting	39.00	to	\$40.00
No. 2 hvy, melting	35.00		36.00
No. 1 busheling	39.00	to	40.00
No. 1 bundles	39.00	to	40.00
No. 2 bundles	32.00	to	33,00
Machine shop turn	27.00	to	28.00
Mixed bor, and turn,	28.00	to	29,00
Shoveling turnings	29.00	to	30.00
Cast fron borings	29.00	to	30.00
Low phos. plate	45.00	to	46.00
Scrap rails, random lgth	47.00	to	48.00
Ralls 2 ft and under	52.00	to	53.00
RR. steel wheels	48.00	to	49.00
RR. spring steel	48.00	to	49.00
RR. couplers and knuckles	48.00	to	49.00
No. 1 machinery cast	43,00	to	44.00
No. 1 cupola cast.	40.00	to	41.00

Detroit

Detroit		
Brokers buying prices per gro-	ss ton, on	CAPE:
No. 1 hvy. melting	38.50 to !	139,50
No. 2 hvy. melting		
No. 1 bundles, openhearth	38.50 to	39.50
No. 2 bundles	27.00 to	28,00
New busheling	38.50 to	39.50
Drop forge flashings	38.00 to	39.00
Machine shop turn	21.00 to	22.00
Mixed bor. and turn	24.00 to	25,00
Shoveling turnings	24.00 to	25.00
Cast iron borings	24.00 to	25.00
Low phos. punch'gs, plate,	38.50 to	39.50
No. 1 cupola cast.	40.00 to	41.00
Heavy breakable cast	34.00 to	35.00
Stove plate	35.00 to	36.00
Automotive cast	43.00 to	44.06

St. Louis

No. 1 hvy. melting			
No. 2 hvy. melting	36.00	to	
No. 1 bundles	40.00	to	41.00
No. 2 bundles	31.50	to	32.50
Machine shop turn,	27.00	to	28.00
Cast iron borings	28.00	to	29.00
Shoveling turnings	28.00	to	29.00
No. 1 RR. hvy. melting	46.00	to	47.00
Rails, random lengths	52,00		
Rails, 18 in. and under	59.00		
Locomotive tires uncut	59.00		
Angles and splice bars	50.00		
Std. steel car axles	49.00		
RR. specialties	50.00		
Cupola cast.	46.00		
Heavy breakable cast.	35.00		
Cast Iron brake shoes	37.00		
Stove plate	38.00		
Cast iron car wheels	47.00		
Malleable	48.00		
Unstripped motor blocks.,	37.00	to	38.00

Boston

Brokers buying prices per gros	s ton, or	cars:
No. 1 hvy, melting	36.00 to	\$37.00
No. 2 hvy, melting	29.00 to	
No. 1 bundles		37.00
No. 2 bundles	27.50 to	28.00
No. 1 busheling	36,00 to	37.00
Elec. furnace, 3 ft & under	38.50 to	39.50
Machine shop turn	19.00 to	20.00
Mixed bor, and short turn, .	22.00 to	23.00
Shoveling turnings	23.00 to	24.00
Clean cast chem. borings	20.00 to	21.00
No. 1 machinery cast	31.00 to	32,00
Mixed cupola cast.	29.00 to	30.00
Heavy breakable cast	32.00 to	33.00
Stove plate	28.00 to	29.00
Unstripped motor blocks.		19.00

New York

Brokers buying prices per gro-	s ton, on cars:
No. 1 hvy. melting	140.50 to \$41.50
No. 2 hvy. melting	35.00 to 36.00
No. 2 bundles	32.00 to 33.00
Machine shop turn	19.00 to 20.00
Mixed bor, and turn,	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Clean cast chem. borings	24.00 to 25.00
No. 1 machinery cast	37.00 to 38.00
Mixed yard cast	36.00 to 37.00
Charging box cast	37.00 to 38.00
Heavy breakable cast	37.00 to 38.00
Unstripped motor blocks.,	24.00 to 25.00

Birmingham

No. 1 hvy. melting	38.00	to	\$39.00
No. 2 hvy. melting	34.00	to	35.00
No. 1 bundles	38,00	to	39.00
No. 2 bundles	28.00	to	29.00
No. 1 busheling	38.00	to	39.00
Machine shop turn	25.00	to	26,00
Shoveling turnings	26.00	to	27.00
Cast iron borings	17.00		
Electric furnace bundles	42.00	to	43,00
Bar crops and plate	45.00		
Structural and plate, 2 ft	44.00	to	45.00
No. 1 RR, hvy, melting	43,00	to	44.00
Scrap rails, random lgth	52.00	to	53.00
Rails, 18 in, and under	58.00	to	59.00
Angles & splice bars	53.00	to	54.00
Rerolling rails	57.00	to	58.00
No. 1 cupola cast	47.50	to	48.50
Stove plate	44.50	to	45.50
Charging box cast	30,00	to	31.00
Cast fron car wheels	38.00	to	39.00
Unstripped motor blocks	36.00	to	37,00
Mashed tin cans	15.00	to	16.00

Cincinnati

Brokers buying prices per grou	sa ton, on	cars:
No. 1 hvy. melting		
No. 2 hvy. melting	35.50 to	36.50
No. 1 bundles	42.00 to	43.00
No. 2 bundles		34.00
Machine shop turn.	28.50 to	29.50
Mixed bor, and turn,		25.00
Shoveling turnings		32.50
Cast iron borings		26.00
Low phos. 18 in. & under .		51.00
Rails, random lengths		54.00
Rails, 18 in, and under		61.00
No. 1 cupola east.		47.00
Hvy. breakable cast		42.00
Drop broken cast	50.00 to	51.00

San Francisco

No. 1 hvy. melting	\$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 2 bundles	29.00
Machine shop turn	18.00
Cast iron borings	18.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast.	45.00

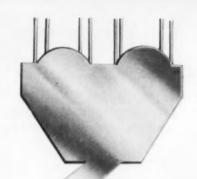
Los Angeles

No. 1 hvy. melting	\$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn	18.90
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under.	39.00
No. 1 RR. hvy. melting	45.00
No. 1 cupola cast.	40.00
Seattle	

No. 1	hvy. melting		\$42.00
No. 2	hvy, melting		38.00
No. 2	bundles		34.00
No. 3	bundles		30.00
	cupola cast,		40.00
Mixed	yard cast		40.00

Hamilton, Ont.

	\$38,50
No. 2 hvy. melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Bushelings	33.50
Bush., new fact. prep'd	
Bush., new fact. unprep'd	32.50 16.00
Machine shop turn	25.50
Short steel turn.	17.00
Mixed bor, and turn\$16.00 to Rails, rerolling	47.50
Cast scrap 42.00 to	45.00



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IMPORT & EXPORT - LIVINGSTON & SOUTHARD, INC., 99 Park Ave., New York, N. Y. . Cable Address: FORENTRACO

CHICAGO, ILLINOIS

Floods Hit Northeast Again

Connecticut again hardest hit . . . Copper and brass mills in at least partial operation . . . Trucks doing all transportation.

♦ THREE-DAY RAINS last weekend lashed Connecticut and adjacent parts of New York and New Jersey, sending flooded rivers rampaging over areas still digging out from the disaster of Aug. 19.

Connecticut again is the hardest hit. Large sections of the southwest portion of the state are under water, with roads, railways and power lines washed out.

Connecticut's copper and brass industry, badly crippled by the August floods, spent an agonizing weekend waiting for Monday to learn the extent of the damage. Fortunately for the industry and their customers, the new storms have done relatively little damage.

Chase Brass & Copper Co. in Waterbury, Conn., told The Iron Age by telephone that the only real loss they anticipated was Monday's production. All workers were called back on Tuesday, and no further losses are anticipated. Physical damage to plants is described as negligible.

The American Brass Co., Anaconda subsidiary, reported 15 in. of water in its Ansonia, Conn., wire mill. "But by comparison, that's nothing," a company spokesman remarked. All the company's plants are in at least partial production, and the Nov. 1 target date for resumption of full production, set after the August storms, is unchanged.

Both companies said transportation was not a major problem despite disrupted rail lines. Trucks were doing the job.

While production facilities are relatively unscathed, the cumulative effects of the new floods are sure to be felt for a long time. Just being located in a disaster area poses formidable operating problems. There is no reason to question the mills' operating and production estimates, but it won't be easy for them.

Meanwhile, custom smelters continue to whittle away at the copper price. They dropped their price ½¢ per pound to 45¢ last week, narrowing the spread between custom smelters and producers to 2¢ per lb. Primary producers are still unable to meet all demands for metal at 43¢ per lb.

September Copper Institute figures seem to indicate the industry has fully recovered from the strike-caused losses this summer. Production of refined copper rose over 41,000 tons from August levels to a September total of 139,880 tons, a new all-time record.

Deliveries of refined copper to domestic consumers during the month were 144,571 tons, highest deliveries reported since May 1953. Stocks of the refined metal in the hands of producers rose 4275 tons to a total of 53,625 tons.

The Office of Defense Mobilization, in announcing first quarter of 1956 allocations of copper and aluminum, said it is earmarking 60,067,000 lbs of copper and copper base alloys for production of defense items in the first quarter. This is 4 pct more than is set aside for military production in the current quarter.

Aluminum allocations are to total 120,026,000 lbs, which is 1.3 pct below the current figure.

ALUMINUM . . . September production of primary aluminum was 261,211,002 lb, slightly under the all-time record of 267,101,817 lb poured in the previous month, according to the Aluminum Association.

September production did make possible some new records. The ninemonth total of 2,313,382,992 lb is a new high for the period, well above 1954's nine-month output of 2,174,-378,648 lb. Production in third period of 793,649,982 lb is the highest yet registered for any quarter.

Sales of aluminum building materials were up 20 pct above the same quarter of 1954, according to Edward Manix, vice president, Nichols Wire & Aluminum Co. He added that several products within the group showed gains of 30 to 40 pct., a definite record.

Despite a slower first half, the building materials classification accounted for the largest share of aluminum consumption, 19.02 pct, against 16.6 pct for the previous leader, the transportation industry, during the first 6 months of this year, Mr. Manix said.

NICKEL . . . International Nickel Co. has raised base prices on Monel mill products from 2.00¢ to 6.00¢ per lb, effective Oct. 15. Base prices for nickel products remain unchanged.

New prices per pound f.o.b. mill are: Monel rods, 74.00¢; plates, 87.00¢ seamless tubes, 110.00¢; cold-rolled sheet, 83.00¢; cold-rolled strip, 92.00¢; shot and blocks, 71.00¢.

LEAD & ZINC . . . Demand for both metals continues good. In a surprise move, two companies raised Prime Western zinc prices by .050¢ per lb to 13.250¢ E. St. Louis, effective immediately. Other producers continued to book orders at previous 13.00¢ per lb level. Since this price increase was unexpected, the zinc price pattern is unclarified. Therefore, the 13.25¢ per lb East St. Louis price is quoted on a tentative basis.

Daily Nonferrous Metal Prices

(Cents per 1b except as noted)

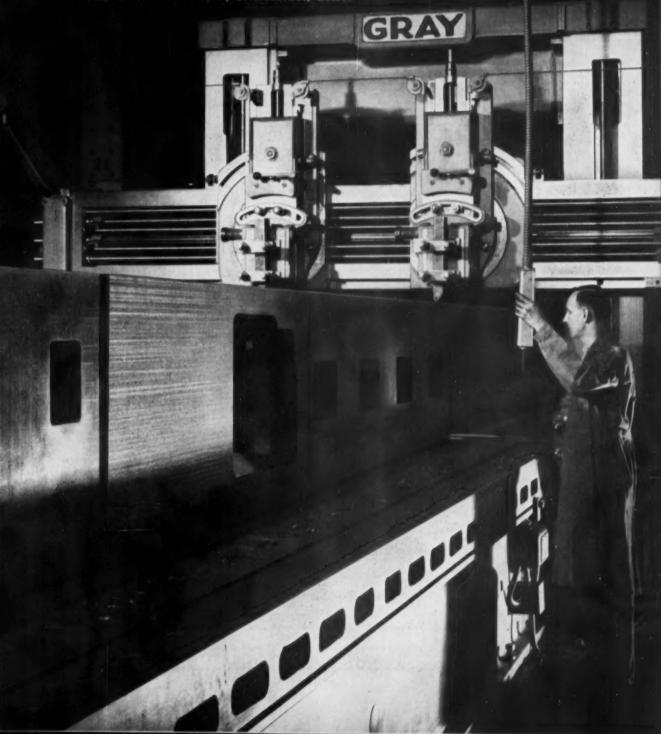
	Oct. 121	Oct. 13	Oct. 14	Oct. 15	Oct. 17	Oct. 18
Copper, electro, Conn.	****	43.00	43.00		43.00	43.00
Copper, Lake, delivered	****	43.00	43.00		43.00	43.00
Tin, Straits, New York		96.125	96.125	96.25	96.125	96.125*
Zinc, East St. Louis		13.00	13.00	13.00	13.25	13.25*
Lead, St. Louis		15.30	15.30	15.30	15.30	15.30
Note: Quotations are going p	rices. th	loliday				Tentative



The GRAY is recognized by machine shops throughout the world as the ultimate in planers. Built for high production with great precision, it combines more original engineering developments and production features than any other planer. It is in such demand that GRAY is the largest planer builder, further proof that

Quality doesn't cost . . . it pays.

The G. A. GRAY Co., Cincinnati, Ohio.



MILL PRODUCTS

(Cents per Ib, unless otherwise noted)

(Base 20,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Shoot (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136- .249	3.250-
1100, 3003	40.8	38.7	37.5	36.5
5052	48.3	43.4	41.7	39.9
6061-0	45.4	41.2	39.4	39.3

Extruded Solid Shapes

	1	7	1.5	11	10	1					6063 T-5	6062 T-6
6- 8 12-14.						,	,				41.6-43.3 42.3-43.7	56.6-60.2 57.5-61.8
24-26. 36-38.											45.3-45.7 53.6-54.2	67.7-72.1 90.5-94.3

Screw Machine Stock-2011-T-3

Size*	34	36-56	%-1	134-134
Price	54.5	53.4	52,1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length'	72	96	120	144	
.019 gage	\$1,295	\$1.727	\$2.160	\$2.590	
	1.615	2.162	2.692	3.232	

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ½ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 78¢; 0.082 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Red: FS, diam \(\frac{1}{2} \) to 0.511 in., 82.5¢; \(\frac{1}{2} \) to \(\frac{1}{2} \) in., 65¢; 1\(\frac{1}{2} \) to \(\frac{1}{2} \) in., 65¢; 2\(\frac{1}{2} \) to \(\frac{1}{2} \) in., 57¢. Other alloys higher. Base up to \(\frac{1}{2} \) diam, 10,000 ib; \(\frac{1}{2} \) to \(\frac{2}{2} \) in., and larger, 20,000 ib.

20,000 lb; 2 in. and larger, 20,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb. 3.5 in., 70.7¢; 0.22 to 0.25 lb. 5.9 in., 60.9¢; 0.50 to 0.59 lb. 16.5 in., 60.8¢; 4 to 6 lb., 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb., 10,000 lb; ½ to 1.80 lb., 20,000 lb., 20,000 lb.

30,000 lb. Extruded Round Tubing; FS, 0.049 to 0.057 in. wall thickness: OD 34 to 5/16 in., \$1.625; in. wall thickness: OD 34 to 5/16 in., \$1.625; 5/16 to 36 in., \$1.625; and \$1.625; and

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Shapes
Conner	56.79	2000	
Copper			58.86
Copper, h-r	58.76	55.11	****
Copper, drawn.	1144	56.36	****
Low brass	53.15	53.09	
Yellow brass .	49.27	49.21	
			4 4 1 5
Red brass	54.54	54.48	
Naval brass	52.83	47.14	48,40
Leaded brass			45.74
Com. bronze	56.48	56.42	
			20.00
Mang. bronse	56.57	50.67	52.23
Phos. bronze	77.14	77.64	****
Muntz metal	50.94	46.75	48.00
Ni silver, 10 pct		66.13	68,50
Beryllium coppe		1.9% Be.	
2000 lb, f.o.b.		10 000	
Strip			\$1.84
Rod bar w	rire		1.01

Nickel, Monel, Inconel

(Rose prices, f.o.b. mill)

"A" Nickel	Monel	Inconel
Sheet, CR 102	83	99
Strip, CR 102	92	125
Rod, Bar, HR 87	74	93
Angles, HR 87	74	93
Plate, HR 97	87	95
Seamless Tube, 122	110	153
Shot, Blocks	71	

Titonium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$14.00-\$14.50; alloy \$16.50; Plate, HB, commercially pure, \$15.0-\$12.00; alloy \$15.50-\$12.75; Wire, rolled and/or drawn, commercially pure, \$10.50-\$11.00; alloy, \$12.50; Bar, HR or forged, commercially pure, \$8.50-\$8.75; alloy, \$8.50-\$9.00.

PRIMARY METAL

(Cents per lb, unless otherwise noted)
Aluminum ingot, 99+%, 10,000 lb,
freight allowed 24.40
Aluminum pig 22.50
Antimony, American, Laredo, Tex., 33.50
Beryllium copper, per ib conta'd Be.\$43.00
Beryllium aluminum 5% Be, Dollars
per lb contained Be\$72.75
Bismuth, ton lots \$2.25
Cadmium, del'd \$1.70
Cobalt, 97-99% (per lb)\$2.60 to \$2.67
Copper, electro, Conn. Valley 43.00
Copper, Lake, delivered 43.00
Gold, U. S. Treas., per troy oz \$35.00
Indium, 99.9%, dollars per troy oz. \$2.25
Iridium, dollars per troy og \$100 to \$120
Lead, St. Louis
Lead, New York 15.50
Magnesium, 99.8+%, f.o.b. Freeport,
Tex., 10,000 lb, pig 32.50
ingot 33.25
Magnesium, sticks, 100 to 500 lb 53.00
Mercury, dollars per 76-lb flask,
f.o.b. New York\$276 to \$281
Nickel electro
Nickel oxide sinter at Copper
Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy os\$22 to \$24
Platinum, dollars per troy og \$91 to \$95
Silver, New York, cents per troy oz., 92.90
Tin, New York
Titanium, sponge, grade A-1 \$3.95
Zinc, East St. Louis
Zinc, New York 18.75
Zirconium, sponge\$7.50 to \$10.00
run raminami, abanda

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)
 (Centa per lb delivered, carloads)

 85-5-5-5 Ingot
 41.00

 No. 115
 41.00

 No. 120
 40.50

 No. 123
 40.00

 80-10-10 ingot
 44.75

 No. 205
 44.75

 No. 315
 43.00

 88-10-2 ingot
 56.25

 No. 210
 56.25

 No. 215
 52.76

 No. 245
 47.25

 Yellow ingot
 No. 405
 32.75

 Manganese bronze
 No. 421
 36.25

Aluminum Inget

(Cents per lb del'd 30,000 lb and over)

Steel deoxidizing aluminum, notch bar aranulated ar shot

Grade	1-95-97%	16								.31.00-32.2
Grade	2-92-95%		2	×					ĸ	.30.00-31.7
	3-90-92%									
Grade	4-85-90%		0	0	0		0	0	ķ	.28.50-29.7

SCRAP METALS

Brass Mill Scrap

(Cet	nts per	90	n	29	0.5	,0	0	ad is per 0 lb and	over)
		7						Heavy	Turnings
Copper			0					39	381/4
Yellow	brass							28 %	26 %
Red br	3.00		0	0 1	0 1	0	0	34%	33 1/2
Comm.	bronse	0				0	0	35%	35
Mang.	bronze		0	4				27	25%
Yellow	brass	ro	ã	-	es	nd	s	28%	

Custom Smolters Scrap

		ound to r	C	a1	rl	01	13.6	1		delivered
No. 1 co										39
No. 2 co	pper	wire				×		×		371/2
Light co	pper	****						×	 *	35 14
*Refiner;									 *	35 1/2

1--- Makes Cons

	0.01	gor	mu	86	F 30.	- 4	20		Ψ.	
(Cents	per	poun	de	ar	loc	ıd		lot	8, 0	lelivered
		£	re	PE PE	erg	y)				
No. 1	coppe	r wh	e.	**						39
No. 2										37 1/2
Light o										35 1/4
No. 1	comp	ositio	n .			8.6	8			311/2
No. 1	comp.	tur	ning	18						31
Rolled	bras	B					*	R 1		25
Brass	pipe							* *		25
Radiat	ors .					* *		1 8		25 %
			Alun	nin	154.9	95				
Mixed	old o	cast.							20	-21
Mixed	new	clips					. ×		21	-22
Mixed	turni	ngs.	dry		1.8	× 1		* *	20	-211/2

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire.	35 -35 1/2
No. 2 heavy copper and wire.	34 -34 1/2
Light copper	32 -32 1/2
New type shell cuttings	311/2-32
Auto radiators (unsweated)	21 -21 1/2
No. 1 composition	28 -28 1/2
No. 1 composition turnings	26 -2614
Unlined red car boxes	231/2-24
Cocks and faucets	23 -23 1/2
Mixed heavy yellow brass	21 1/2 22
Old rolled brass	
Brass pipe	231/2-24
New soft brass clippings	
No. 1 brass rod turnings	21 -211/2

Aluminum

Alum. Pistone and strute	
Aluminum crankcases	171/2-18
1100 (28) aluminum clippings	19 1/2
Old sheet and utensils	171/2-18
Borings and turnings	1111 1/2
Misc. cast aluminum	17 -171/2
2024 (24s) clippings	18 -181/2

Zinc New zinc clippings 8 - 81/2

Zine routings	4
Nickel and Monel Pure nickel clippings Clean nickel turnings Nickel anodes Nickel anodes New Monel clippings	\$1.25 \$1.00 \$1.50
Clean Monel turnings Old sheet Monel Nickel silver clippings, mixed Nickel silver turnings, mixed.	44 50 23 19

	Lead	
Battery plates		
Batteries, acid	Iree 1	1/4

| Magnesium | Segregated solids | 18 ½ -- 19 | Castings | 17 ½ -- 18

Block tin \$0 81	
No. 1 pewter 6364	
Auto babbitt 42 -43	
Mixed common babbitt 14 1/2	
Solder joints 19 1/2-20	
Siphon tops	
Small foundry type 1613	
Monotype	
Line and stereotype 14 -1414	

Miscellaneous

	RON AGE		Italics ide	mtily preduct	re listed in	key at end o	table. Bas	e prices, f.a.h	mill, in cents	per B., unless	otherwise no	eed. Eatre	а арргу.	
STEEL PRICES (Effective Oct. 18, 1955)		BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Het- rolled	Cald- relled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- railed	Alloy Cold- rolled
	Bethlehem, Pa.			\$96.00 83		4.65 B3	6.80 B3	4.65 B3						
	Buffalo, N. Y.	\$68.54 B3	\$84.50 RJ, BJ	\$96.00 R3, B3	5.45 B3	4.45 B3	6.80 B3	4.45 B3	4.325 R3,B3	6.25 B3 6.25 R7,5/0	6.425 B3	9.10 B3		
	Claymont, Del.			83						****				
1	Harrison, N. J.													13.45 CI
	Conshehecken, Pa.								4.375 A2	6.30 //2	6.425 //3			
	New Bedford, Mass.									6.70 R6				
اء	Jehnstown, Pa.	\$48.50 B3	\$84.50 B3	\$96.00 B3		4.65 B3	6.80 B3	-						
EAST	Besten, Mass.									6.80 78				13.80 78
	New Haven, Conn.									6.70 D1 7.00 A5				
	Phoenizville, Pa.					5.15 P2		5.15 P2						
	Sparrows Pt., Md.								4.325 B3	6.25 B3	6.425 B3	9.10 B3		
	Bridgaport, Wallingtord, Conn.	\$73.50 N8	\$89.50 N8						4.625 N8	6.79 W/			7.50 N8	
	Pawtucket, R. I.									6.80 N7				13.80 N7
_	Worcester, Mass.								450.45	7.10 A5				13.80 N7
	Alton, III.								4.50 L1					
	Ashland, Ky.								4.325 A7					
	Canton-Massillon, Dever, Ohio		886.50 R3	\$96.00 R3										13.45 G#
	Chicago, III.	\$68.50 UI	\$84.50 R3, UI,W8	\$96.80 R3, UI,W8	5.45 UI	4.60 UI, W8	6.75 UI, YI	4.60 UI	4.325 AI, N4,W8	6.35 AI,T8			7.20 19/8	13.45 78
i	Cleveland, Ohio									6.25 A5,J5		9.30 45		13.45 //
	Detrait, Mich.			\$94.00 R5					4.425 G3,M2	6.35 D1,D2, G3,M2,P11	6.525 G3	9.20 D2, G3		
	Duluth, Minn.							-			-			
E WEST	Gary, Ind. Harber, Indiana	\$66.50 UI	\$84.50 UI	\$96.90 UI, YI	5.45 /3	4.60 UI, 13	6.78 UI, 13		4.325 /3, UI, YI	6.35 /3 6.25 Y/	6.425 /3, UI, YI	9.30 Y/	7.28 YI, UI	
MIDDLE	Sterling, III.								4.425 N4					-
2	Indianapolis, Ind.									6.40 CS				
	Newport, Ky.												7.20 N5	
	Middletown, Ohio									6.45 A7				
	Niles, Warren, Ohio Sharon, Pa.	\$68.50 C/0	\$84.50 C10	\$96.00 CIO					4.325 Si, RJ	6.25 SI, R3,T4	8.425 SI, R3	9.10 SI, R3	7.20 SI	13.45 .5/
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$68.50 UI, J3	\$84.50 J3, UI,CII	\$96.00 UI, CII	5.45 UI	4.66 UI. J3	6.75 UI.	4.60 UI	4.325 P6	6.25 57,84			7.20 59	13.45 .51
	Pertamouth, Ohio								4.325 P7	0.25 P7				
	Weirton, Wheeling, Follansbee, W. Va.					4.60 W3			4.325 W3	6.25 F3,W3	6.425 W3	9.10 W3		
	Youngstown, Ohio		\$84.50 C/0	\$96.00 YI, CIO		4.60 Y/	6.75 Y/		4.325 UI. YI	6.25 YI,CS	6.425 UI, YI	9.30 YI	7.20 UI, YI	13.45 C
_	Fentana, Cal.	\$76.00 KI	\$92.00 K1	\$115.00 K/		5.25 K1	7.40 KI	5.40 KI	5.075 KI	8.80 KI	7.525 K1		8.85 K1	
	Genera, Utah		\$84.50 C7			4.60 C7	6.75 C7							
	Kansas City, Me.					4.70 SZ	6.85 S2				4.475 .53		7.45 52	
ST	Los Angeles, Torranco, Cal.		\$94.00 B2	\$116.00 B2		5.30 C7, B2	7.45 B2		5.875 C7, B2	8.30 C/			8.40 B2	
WEST	Minnequa, Colo.					4.90 C6			5.425 C6					
	Portland, Ore.					5.35 02								
	San Francisco, Nilos, Pittoburg, Cal.		194.00 B2			5.25 B2, P9	7.40 B2		5.875 B2, C7					
	Seattle, Wash.		\$95.00 B2			5.35 B2	7.50 B2		5.325 B2					
	Atlanta, Ga.								4.525 .48					-
вости	Fairfield, Ala. City, Birmingham, Ala.	\$68.50 72	\$84.50 72			4.60 CI6, R3, T2	6.75 72		4.325 R3, C16,T2		6.425 TZ			
80	Houston, Lone Star,	\$74.50 L3	\$89.50.52	\$101.00 52		4.70 S2	6.85 S2				6.675 52		7.45 52	

STEEL PRICES (Bifocitive Oct. 18, 1986)					WIRE	TINPLATE		BLACK						
		SHEETS										TINPL	AILT	PLATE
		Hut-rulled /8 ga. & hvyv.	Cold- rolled	Galvanized 10 ga.	Enamel- ing /2 gs.	Long Torne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hat- ralled /9 ga.		Cakes* 1,25-lb. base bes	Electre* #.25-lb. base bes	Hollowess Enemelin 129 gs.
	Bethishum, Fa.													
1	Buffsis, N. T.	4.325 B1	5.325 B3				6.375 B3	7.875 B3			99'6	† Special co	oted mig. 50/Hrem	
1	Claymont, Dul.											† Special cented originaries deduct 50/jirom 1.25-lb. cake hose becomes princ. Commaking annually binchplate 55 to 128 lb. deduct 12.26 forum 1.25-lb. cake hose box. **COKES: 1.80-lb. ab. ab. ab. ab. ab. ab. ab. ab.		
1	Contactilia, Pa.			***************************************								deduct \$2.29	to 128 th. from 1.25-th.	
1	Censbolockon, Pa.	4.375 A2	5.375 A2				6.425 //2					* COKES:	1.00-56.	
ı	Harrisburg, Pa.											ELECTRO	8.58-lb. add	
	Hartford, Conn.											1.00-th. add	add 654; \$1.00. Differ-	
	Johnstown, Pa.										5.825 83	add 65¢.	l	
-	Fairless, Pa.	4.375 UI	5.375 UI				6.425 UI	7.925 UI				\$9.30 UI	\$8.00 UI	
	New Haven, Conn.													
1	Phoonisvilla, Ps.													
	Sparrows Pt., Md.	4.325 B)	E.325 B3	5.85 B3			6.375 B3	7.875 83	8.60 B3		\$.12\$ B3	\$9.30 #5	\$3.00 H3	
	Worceoler, Mass.										6.325 A5			
	Treates, N. J.		2000 - 200 -											-
	Alton, III.										5.20 LI			
	Ashland, Ky.	4.325 A7		5.85 A7	5.90 A7									
	Canton-Massillon,			5.85 R1,										
	Oover, Ohio Chicago, Joliet, III.	4.325 AI,		R3			6.375 UI	-			1.025 A5,			
		W/II	-	~~~~							N4 R3			
	Storting, III.										8.125 N4			
	Cleveland, Ohio	4.325 J3,	5.325 J3, R3		5.90 R3		6.375 J3, R3	7.875 J3, R3			5.825 A5			
	Detroit, Mich.	4.425 GJ, M7	5.425 G3 5.325 M2				6.475 G3	7.975 G3						
5	Newport, Ky.	4.325 N5	5.325 NS	5.85 N5										
DLE WEST	Gary, Ind. Harbor, Indiana	4.325 /3. UI, YI	\$.325 /3, UI, YI	5.85 UI, 13	5.90 UI, 13	6.25 UI	6.375 YI. UI,I3	7.875 UI. YI			5.825 Y/	39.28 I3. UI, YI	\$7.90 I3, UI, YI	8.65 UI. YI
MIDDLE	Granita City, III.	4.525 G2	5.525 G2	6.05 G2	6.10 GZ		-						\$8.60 G2	8.75 G2
	Kekeme, Ind.	4.425 C9	-	5.95 C9						5.475 C9	5.125 C9			
	Manafield, Ohio	4.325 E2	5.325 E2			6.25 E2				EI				
	Middletown, Ohio		5.325 A7	5.85 A7	5.90 A7	6.25 A7								
	Niles, Warren, Ohio Sharen, Po.	4,325 SI, R3,N3	5,325 R3, N3	5.85 R3 6.85 N3	5.90 N3	6.25 N3	6.375 SI. R3	7.875 R3				\$9.20 R3	\$7.90 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 /3, UI, P6	5.325 /3, UI,F6	5.85 UI	5.90 UI, A7		6.375 J3, UI	7.875 UI	8.60 UI		5.825 A5, P6	\$9.20 J3, UI	\$7.96 J3. UI	4.45 UI
	Pertamouth, Ohio	4.325 P7	5.325 P7				-	-			5.825 P7			
	Weirton, Wheeling, Follonshoo, W. Va.	4.325 WJ,	5.325 W3,	5.85 W3,		6.25 W3, W5	6.375 W3	7.875 W3				\$9.20 W3,	\$7.90 W3, W5	6.85 F3 W3
	Follanshoo, W. Va. Youngstown, Ohio	4.325 UI,	8.325 Y/	WS	5.90 Y/	m)	6.375 UI,	7.875 Y/	-		5.825 Y/		",	-
_		YI					YI					-		-
	Fentana, Cel.	5.075 K1	6.425 K1			-	7.125 K/	8.975 K1	-	-			-	-
	Goneva, Utah Kansas City, Mo.	4.425 C7		-	-	-		-	-	-	5.275 S2		-	-
1	Lee Angeles, Terrance, Cal.	-	-	man annual Proper States		-	-	-			6.825 B2		-	
WEST						-			-	-	E 900 CV		-	
	Minneque, Colo.	E 201 CV	A 200	8 40 63				-	-	-	5.275 C6	\$0.05.03	\$8.65 C7	-
	San Francisco, Niles Pittsburg, Cal. Seattle, Wash.	5.025 C7	6.275 C7	6,60 C7			-		-	-	5.675 C7	\$9.95 C7	35.63 C/	-
	The state of the s													
	Atlania, Ga.									-		-	-	-
BOUTH	Fairfield, Ala. Alabama City, Ala.	4.325 R3, T2	5.325 T2	5.85 R3, 72			6.375 72			5.625 R3	\$.82\$ R3, T2	\$9.39 72	\$8.00 72	
8	Houston, Tex.						1				5.275 SZ			

	ON AGE	- '	tents identity pr	MUNICIPA INFLUE	in Key at end of	сание, памер	rices, Louis, mil	ll, in cents per lh	is, unitere otton	LAIN HOUSE F	aues approx.	
STEEL PRICES (Biffective Oct. 18, 1955)				BAI	RS				PLA	TES		WIRE
		Carbon Steel	Reinforc- ing	Cold Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
	Bethlehem, Pa.				5.575 B3	7.425 B3	6.80 B3					
1	Bufalo, N. Y.	4.45 B3,R3	4.45 B3,R3	5.95 B5	5.575 B3, R3	7.425 B3,B5	6.80 B3	4.50 B3,R3				6.25 IV6
1	Claymont, Del.							4.50 C4		6.30 C#	6.725 C4	
	Contesville, Pa.							4.50 L4		6.30 L4	6.725 L4	
	Conshohecken, Pa.							4.50 ,42	5.575 A2		6.725 AZ	
	Harrisburg, Pa.							5.10 C3	5.575 C3			
_	Hartford, Conn.			6.40 R3		7.725 R3						
3	Johnstown, Pa.	4.45 B3	4.45 B3		\$.\$7\$ B3		6.80 B3	4.50 B3		6.30 B3	6.725 B3	6.25 B3
-	Fairless, Pa.	4.80 UI	4.80 UI		\$.725 UI	B 44 11/14						
1	Newark, N. J. Camden, N. J.			4.35 W/0		7.60 W/II						
-		4.80 N8		6.45 W10	5.725 N8			4.750 N8		-		
	Bridgeport, Putnam, Conn.				0.100 ///			2.100 /110				
	Sparrows Pt., Md.		4.65 B3					4.50 (8)		6.30 B3	6.725 B3	6.35 B3
	Palmer, Worcester, Readville, Mass.			6.45 B5,C14		7.725 A5,B5		4.50 RJ				6.55 A5, W6
	Spring City, Pa.			6.35 K+		7.60 K4						
	Alten, III.	4.85 L1										6.425 <i>LI</i>
	Ashland, Newport, Ky.							4.50 A7,N5		6.30 NS		
	Canton-Massillon, Manafield, Ohio	4.75 R)		5.90 R1,R3	8.575 R3, T5	7.425 R2,R3, T5		4.50 E2				
	Chicago, Jeliet, III.	4.65 UI. N4.W8, R3, P13	4.85 N4,R3, P13	\$.90 A5,W10, W8,B5,L2	5.575 UI, R3, W8	7.425 A5,W8, W10,L2,B5		4.50 UI,W8, 13,A1,R3	5.575 UI	6.30 UI	6.725 UI	6.25 A5,R; N4,W7
	Cleveland, Ohio	4.45 R3	4.45 R3	5.90 A5,C13		7.425 A5,C13	6.80 ÆJ	4.60 J3,R3	5.575 /3		6.725 R3, J3	6.25 A5, C/3
	Detroit, Mich.	4.75 G3	4.75 G3	5.90 R5 6.10 B5,P8 6.15 P3	5.575 R5 8.675 G3	7.425 R5 7.625 B5,P3 P8	6.90 G3	4.6N G3			6.825 G3	
WEST	Duluth, Minn.											6.25 A5
MIDDLE W	Gary, Ind. Harber, Crawfordsville	4.65 /3, UI, YI	4.65 13, UI. YI	5.90 M5,R3	5.575 13, UI, YI	7.425 M5, R3	6.80 UI, I3, YI	4.50 /3, UI,YI	5.575 /3	6.30 UI, YI	6.72\$ UI,I3, YI	6.35 M4
9	Granite City, III.							4.70 G2				
	Keksme, Ind.											6.35 C9
	Sterling, III.	4.75 N4	4.75 Ne									6.35 N#
	Niles, Warren, Ohie Sharen, Ps.	4.65 R3,C/6		5.90 C/0	8.575 C/0	7.425 C10	6.80 R3	4.50 SI,R3		6.30 51	6.726 SI	
	Pittsburgh, Ps. Midland, Ps.	4.45 J3, UI,	4.45 J3, UI	\$.90 A5,C8, C11,J5, W10,B4,R3	\$.\$7\$ U1,C11	7.425 A5,C11, W10,C8,R3	6.80 J3, UI	4.50 J3, UI	5.575 UI	6.30 UI	6.725 J3, UI	6.25 A5,J
	Portamouth, Ohio											6.25 P7
	Weirton, Wheeling, Folianabee, W. Va.	4.45 19'3						4.50 W3,W5		1		
	Toungstown, Ohio	4.85 UI.YI. CIO,R3	4.65 UI, YI,	5.90 YI, UI	5.575 UI, YI, CIO	7.425 YI,CIO 7.665 F2	6.80 UI, YI	4.50 UI, YI,		6.30 Y/	6.725 YI	6.25 YI
	Emeryville, Cal.	5.40 J5	5.40 /5									
	Fantana, Cal.	5.35 KI	5.35 KI		6.625 K/		7.50 KI	5.15 K/		6.95 KI	7.375 KI	
	Geneva, Utah							4.50 C7			6.725 C7	
	Kansas City, Ma.	4.90 52	4.90 57		5.825 S2		7.05 S2					6.50 52
WEST	Les Angeles, Terrance, Cal.	5.25 B2,C7	\$.3\$ B2,C7	7.35 R3	6.625 B2		7.50 B2				7.625 B2	7,20 83
	Minnegua, Colo.	5.10 C6	5.10 C6					5.35 C6	-			6.50 C6
	Portland, Ore.	5.40 02	5.40 02									
	San Francisco, Niles Pittsburg, Cal.	5.35 C7 5.40 B2,P9	5.35 C7 5.40 B2,P9				7.55 82					1.20 C7
	Seattle, Wash.	5.49 B2,P12 N6	5.48 B2,P12				7.55 B2	5.40 B2		7.20 B2	7.625 B2	
	Atlanta, Ga.	4.85 /48	4.85 .48							-		6.45.48
ВО	Fairfield, Ala. City, Birmingham, Ala.	4.65 T2,C/6,	-				6.80 T2	4.50 T2,R3		-	6.725 T2	6.25 R3,
8	Heuston, Ft. Worth, Lone Star, Tex.	4.90 52	6.90 52		5.825 52		7.05.52	4.85 L3 4.60 S2		0.40.52	6.826.57	6.50 .52

Steel Prices (Effective Oct. 18, 1965)

Key to Steel Producers

With Principal Offices

Al Arms Steel Co., Chicago

Al Alan Wood Steel Co., Comholocken, Pa.

A3 Allegheny Ludlum Steel Corp., Pittaburgh

A4 American Cladmetals Co., Carnegie, Pa. A5 American Steel & Wire Div., Cleveland

A6 Angell Nail & Chaplet Co., Cleveland

A7 Armco Steel Corp., Middletown, O.

All Atlantic Steel Co., Atlanta, Ga.

BI Balscock & Wilcox Tube Div., Beaver Falls, Pa.

B2 Bethlehem Pacific Coast Steel Corp., San Francisco

Bethlehem Steel Co., Bethlehem, Pa. RI Blair Strip Stool Co., Bethlehem, Pa.
Blair Strip Stool Co., New Castle, Pa.
Blais & Laughlin, Inc., Harvey, III.
Blook Plant, Wickwire Spencer Steel Div.,
Birdsboro, Pa.

Cl Calstrip Steel Corp., Los Angele

C2 Carpenter Steel Co., Roading, Pa.
C3 Central Iron & Steel Co., Harrioburg, Pa.

Claymont Products Dept., Claymont, Del

C5 Cold Metal Products Co., Youngstown, O.
C6 Colorada Fuel & J.

C6 Colorado Fuel & Iron Corp., Denver C7

Columbia Geneva Steel Div., San Francisco Columbia Steel & Shafting Co., Pittaburgh CI

Continental Steel Corp., Kokomo, Ind.

C10 Copperweld Steel Co., Pittsburgh, Pa.

CII Crucible Steel Co. of America, Pitteburgh C12 Cumberland Steel Co., Cumberland, Md.

C13 Cuyahoga Stoel & Wire Co., Cleveland

C/# Compressed Steel Shafting Co., Readville, Mass.

C15 G. O. Carleon, Inc., Thorndale, Pa.

C16 Connurs Steel Div., Birmingham C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit

D1 Detroit Steel Corp., Detroit

D? Detroit Tube & Steel Div., Detroit

D3 Driver Harris Co., Harrison, N. J.

D4 Dickson Weatherproof Nail Co., Evanston, III.

D5 Honry Disston & Sons, Inc., Philadelphia

El Eastern Stainless Steel Corp., Baltimore

E3 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.

F2 Fitzsimmons Steel Corp., Youngstown F3 Follansbee Steel Corp., Follansbee, W. Va.

GI Globe Iron Co., Jackson, O.

G2 Granite City Steel Co., Granite City, Ill.

G3 Great Lakes Steel Corp., Detroit

G# Greer Steel Co., Dover, O.

III Hanna Furnace Corp., Detroit

12 Ingersoil Steel Div., Chicago

13 Inland Steel Co., Chicago

14 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.

James & Laughlin Steel Corp., Pattsburgh

J4 Joslyn Mlg. & Supply Co., Chicago J5 Judson Steel Corp., Emeryville, Calif.

KI Kaiser Steel Corp., Fontana, Cal.

K2 Keystone Steel & Wire Co., Peoria K3 Koppers Co., Granite City, III.

K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis

L2 La Salle Steel Co., Chicago

L3 Lone Star Steel Co., Dallas L4 Lukens Steel Co., Coatesville, Pa.

MI Mahoning Valley Steel Co., Niles, O.

M2 McLouth Steel Corp., Detroit M3 Mercer Tube & Mfg. Co., Sharon, Pa.

M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.

M5 Monarch Steel Div., Hammond, Ind.

M6 Mystic Iron Works, Everett, Mass.

NI National Supply Co., Pittsburgh

N2 National Tube Div., Pittsburgh N3 Niles Rolling Mill Div., Niles, O.

N4 Northwestern Steel & Wire Co., Sterling, III.

N5 Newport Steel Corp., Newport, Ky. N6 Northwest Steel Rolling Mills, Seattle

N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

01 Oliver Iron & Steel Co., Pittsburgh

02 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.

P2 Phoenix Iron & Steel Co., Phoenixville, Pa.

P3 Pilgrim Drawn Steel Div., Plymouth, Mich.

P4 Pittsburgh Coke & Chemical Co., Pittsburgh

P5 Pittsburgh Screw & Bolt Co., Pittsburgh

P6 Pittsburgh Steel Co., Pittsburgh P7 Portamith Div., Detroit Steel Corp., Detroit

Pf Plymouth Steel Co., Detroit

P9 Pacific States Steel Co., Niles, Cal.

P10 Precision Drawn Steel Co., Camden, N. J. P11 Production Steel Strip Corp., Detroit P12 Pacific Steel Rolling Mills, Seattle

P13 Phoenis Mig. Co., Joliet, Ill.

Al Reeves Steel & Mig. Co., Dover, O.

R2 Reliance Div., Eaton Mlg. Co., Massillon, O. R3 Republic Steel Corp., Cleveland

84 Roshling Sons Co., John A., Trenton, N. J.

R5 Rotary Electric Steel Co., Detroit

R6 Rodney Metals, Inc., New Bedford, Mass. R7 Rome Strip Steel Co., Rome, N. Y.

SI Sharon Steel Corp., Sharon, Pa.

52 Sheffield Steel Corp., Kansas City

53 Shenango Furnace Co., Pittaburgh

54 Simonds Saw & Steel Co., Fitchburg, Mass. 55 Sweet's Steel Co., Williamsport, Pa.

56 Standard Forging Corp., Chicago

57 Stanley Works, New Britain, Conn.

58 Superior Drawn Steel Co., Monaca, Pa.

59 Superior Steel Corp., Carnegie, Pa. 510 Seneca Steel Service, Buffalo

71 Tonawanda Iron Div., N. Tonawanda, N. Y.

72 Tennessee Coal & Iron Div., Fairfield
73 Tennessee Products & Chem. Corp., Nashville

74 Thomas Strip Div., Warren, O.

75 Timken Steel & Tube Div., Canton, O. To Tremont Nail Co., Wareham, Mass.

77 Texas Steel Co., Fort Worth 78 Thompson Wire Co., Boston

UI United States Steel Corp., Pittsburgh

U? Universal-Cyclops Steel Corp., Bridgeville, Pa.

U3 Ulbrich Stainless Steels, Wallingford, Conn.

U4 U. S. Pipe & Foundry Co., Birmingham

WI Wallingford Steel Co., Wallingford, Conn.

W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.

wercon Steen Co., westrom, w. va.

W Wheatland Tube Co., Wheatland, Pa.

W5 Wheeling Steel Corp., Wheeling, W. Va.

W6 Wickwire Spencer Steel Div., Buffalo

W7 Wilson Steel & Wire Co., Chicago

W8 Wisconsin Steel Co., S. Chicago, Ill.

W9 Woodward Iron Co., Woodward, Ala.

WIO Wycaff Steel Co., Pittsburgh
WII Worcester Pressed Steel Co., Worcester, Mass.

VI Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.a.b. mills. Base price about \$200 per not ton

							BUTTY	VELD										SEAM	ILESS			
	3/4	In.	861	in.	11	m.	11/4	In.	11/4	In.	21	n.	21/6-1	i in.	2	In.	23/	in.	3	in.	31/2	i in.
STANDARD T. & C.	Dik.	Gal.	Bik.	Gal.	Bik.	Gal.	Dik.	Gal.	Blk.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gel	Bik.	Gal.	Blk.	Gal.
parrawa Pt. B3 compariown R5 contana KI Pittaburgh J5 Millian N1 subsecon R5. subse	15.00 17.50 6.00 17.50 15.50 17.50 17.50 17.50 17.50 17.50 17.50	0.25 0.25 +0.25 2.25 0.25 2.25 2.25 2.25 2.25 2.25	18.50 20.50 9.00 20.50 18.50 20.50 18.50 20.50 20.50 20.50 20.50 20.50	4.85 4.25 +5.25 6.25 4.25 6.25 6.25 6.25 6.25 6.25 6.25 6.25	21.00 23.00 11.50 23.00 21.00 23.00 23.00 23.00 23.00 23.00 23.00 23.00 23.00	7.76 7.75 +1.75 9.75 7.76 9.75 7.78 9.75 9.75 9.75 9.75 9.75	23.50 25.50 14.00 25.50 23.50 25.50 25.50 25.50 25.50 25.50 25.50 25.50 25.50	8, 50 9, 00 +1, 00 10, 50 8, 50 10, 50 10, 50 10, 50 10, 50 10, 50 9, 50 10, 50	24,00 26,00 14,50 26,00 24,00 26,00 26,00 26,00 26,00 26,00 26,00 26,00 26,00		26,50 24,50 26,50 26,50 26,50	10,00 10,50 0,50 12,00 10,00 12,00 12,00 12,00 12,00 12,00 12,00 12,00	28.00 28.00 16.50 28.00 28.00 28.00 28.00 28.00 28.00 28.00 28.00 28.00 28.00	9.75 10.75 0.25 11.75 9.75 11.75 11.75 11.75 11.75 11.75 11.75	6.50 6.50	+8.50 +8.50 +8.51	10.54 10.54	+6.25 +6.25 +6.25 +6.25 +6.25	13.00	+3.75	14.50	+2.21
EXTRA STRONG PLAIN ENDS Sparrows PI. B3 Toungatown R3 Fauiness N2 Fauiness N2 Fauiness N2 Fauiness N3 Flittsburgh J3 Alton, Bi. L1 Sharon M3 Plittsburgh N1 Whealing W5 Whealing W5 Voungatown Y1 Indiana Harber Y1 Lorain N2	29.0 22.0 22.0 22.0 22.0	6.25 6.25 6.25 6.25 8.25 8.25 8.25 8.25 8.25 8.25 8.25	24.00 14.50 26.00 24.00 26.00 26.00 26.00 26.00 25.00		26.00 16.50 28.00 26.00 28.00 28.00 28.00 28.00 28.00 28.00 27.00	13.78 13.75 13.75 13.75 13.75 15.75 15.75 15.75 15.75 15.75 15.75	26.50 17.00 28.50 26.50 28.50 28.50 28.50 28.50 28.50 27.50	12.50 13.00 12.50 14.50 12.56 14.50 14.50 14.50 14.50 14.50	17.50 29.00 27.00 29.00 29.00 29.00 29.00 29.00 28.00	15.50	27,58 18.00 29,58 27,58 29,58 29,58 29,58 29,58	16.00 14.00 16.00 16.00 16.00	36.00 28.00 18.50 36.60 25.00	12.75 13.75 12.75 14.75 14.75 14.75 14.75 14.75 14.75 14.75 14.75 14.75 14.75	8.00	+6.00	13.0	0 +2.71 0 +2.71 0 +2.71 0 +2.71	15.54	+0.25	20.56 20.56 20.56	4.7

Threads only, buttweld and seamless 2½ pt higher discount. Plain onds, buttweld and seamless, 3-in. and under, 4½ pt higher discount. Buttweld jobbers discount. Spct. Galvanized discounts based on zinc price range of ever 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in time, discounts vary as follows: ½, ¾, and 1-in., 2 pt.; 1½, 1½ and 2-in., 1 pt. e.g., ninc price range of ever 11¢ to 13¢ would lower discounts; sinc price in range ever 7¢ to 9¢ would increase discounts. East St. Louis sinc price new 13.89¢ per lb.

To identify producers, see Key on preceding page.

MERCHANT WIRE PRODUCTS

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bare	Track Spikes	Screw Spikes	Tie Plates	Track Belts Treated
Bessemer UI	4.725	5.65	5.825				
So. Chicago R3.	*****			7.50			
Engley T2	4.725	5.65					
Fairfield TZ		5.65		7.58		5.625	
Gary Ul	4.725	5.65				5.625	
ind. Harber 13.	14,725		5,825	7.50		15,525	
Johnstown B3		5.65					
Juliat UI		15, 65	5.825				
Kansas City S2				7.90			
Kansas City S2 Lackswanna B	4.725	5.65	5.825			5.625	
Minnagua C6	4.725	6.15	5.825	7.58		8,625	12.4
Pittsburgh 01.					11.96		12.4
Pittaburgh P5							12.40
Pittaburgh /3.				7.98			
Seattle B2				8.49		5.775	12.90
Steelton B3							
Struthers Y1				7.96			
Terrance C7						5.775	
Williamsport S.	5	5.65					
Toungstown R3		1		7.96	1	1	1

ELECTRICAL SHEETS

22-Gage	Hat-Rolled	Cold-Reduced (Coiled or Cut Length)				
F.a.b. Mill Cents Per Lb	(Cut Lengths)*	Semi- Processed	Fully Processed			
Field	8.40 9.35	8.60				
Armature		9,60	10.10			
Meter	10.95	11.20	11.70			
Dynamo	11.85	12.10	12.60			
Trans. 72	12.80	13.05	13.55			
Trans. 65	13,35	Grain (Oriented			
Trans. 58	13.85 14.85	Trans. 80. Trans. 73.	17.4			

Producing points: Beach Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (F3); Manafold (E2); Nowport, Ky. (M5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanoaville (A7).
* Coils 75¢ higher.

WARE-									Base	price, f.	a.b., del	lars per 1	00 lb.	
HOUSES		Sheets		Strip Plat		Plates	Shapes	Bars		Alloy Bara				
Onise Dollarery	Hat-Rolled	Cald-Relled	Cabraciand (18 gags)	Het-Relled	Cald-Relled		Standard Structural	Het-Relled	Codd- Finished	Het-Relbed 4615 As relbed	Hat-Ralled 4140 Annealed	Cold-Drawn 4615 As relied	Celd-Drawn 4140 Ameraled	
Baltimare \$.1	0 7.03	8.32	8.37	7.65		7.21	7.93	7.61	8.62	14.38	13.44-	16.36	16.29-	
Birmingham 1	5 6.80	7.93	8.85	7.06		6.99	7.28	7.08	9.35		13.96		16.49	
Boston	0 7.70	8.81	10.27		10.30	7.89	8.13	7.83	9.53	13.65-	13.40-	16.65	16.50	
Buffale	6.80	8.65	9.77	7.96		7.15	7.40	7.10	7.90	13.88	13.45 13.10		16.15	
Chicago	5 6.80	8.00	8.50	7.66		6.99	7.28	7.08	7.75	13.20	12.85	16.05	15.90	
Cincinnati	5 6.92	8.33	8.90	7.30		7.28	7.75	7.32	8.05	13.44	13.09	16.29	16.14	
Cleveland	6.80	8.09	8.85	7.16		7.16	7.61	7.14	7.85		12.91		15.96	
Denver	8.60	10.00	11.22	8.90		8.60	8.75	8.90	9.82				17.97	
Detroit	5 6.99	8.53	8.78	7.34	8.15	7.27	7.75	7.36	3.04	13.40	13.65	16.25	16.10	
Houston	7.85	8.75	10.49	8.15		7.60	8.20	8.25	9.85	14.35	14.00	17.15	16.86	
Kansas City	7.47	8.60	9.17	7.73		7.66	7.95	7.75	9.95 8.52		13.52			
Lee Angeles	8.65	10.00	11.00	8.35		8.65	8.30	8.05	11.25		14.25		17.80	
Memphia	10 7.12	8.25		7.38		7.31	7.60	7.49	9.15					
Milwaukee	15 6.89	8.18	8.59	7.15		7.88	7.45	7.17	7.94		12.94		15.99	
New Orlsans	15 7.20	8.35		7.45		7.40	7.70	7.50	9.50					
New York	10 7.46	8.68	9.44	8.67	9.95	7.76	7.99	7.96	9.48	13.43	13.28	16.45	16.33	
Narfolk	20 7.25			7.45		7.45	7.95	7.65	9.50					
Philadelphia	16 7.14	8.42	9.35	7.67		7.37	7.74	7.64	8.46	13.51	13.16	16.36	16.2	
Pittsburgh	25 6.60	8.09	9.20	7.16	9.60	6.95	7.28	7.68	7.85	13.20	12.85	16.05	15.90	
Portland			10.65	8.66		7.71		7.95	12.20		15.00		17.5	
Salt Lake City	20 8.60	10.60		9.35			9.20	9.15						
San Francisca	10 8.16	9.65	10.15	8.31		8.00	8.25	8.05	11.20		14.25		17.8	
Seattle	88 8.51	10.46	10.80	8,65		8.21	8.30	8.35	11.70		14.60		. 17.6	
St. Louis	25 7.00	8.38	9.19	7.35		7.21	7.68	7.37	8.14	13.49	13.14	16.35	16.1	
St. Paul	25 7.46	8.59		7.71		7.6	7.94	7.74	8.51		13.51		. 16.3	

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 ib or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity. Exceptions: (4) 1500 to 9999 lb. (8) 1000 lb or over. (8) \$.25 delivery. (4) 1000 to 1999 lb. \$.25 delivery.

	Standard & Costed Nails	Weven Wire Fence 9-15/2 ga.	"T" Fence Pasts	Single Leep Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Gale.
F.o.b. Mill	Col	Col	Col	Cal	Col	ė/lb.	¢/16.
Alahams City R3 Aliquippa, Pa. J3 Atlanta A8. Bartonville K2* Buffalo W6.	152 154 154	162 162 167 168		175	181	7.40	7.80 7.80 8.025 8.075 7.80
Chicago, III. N4** Cleveland A6 Cleveland A9 Crawfordsville M4*	157 157	166		173	179	7.48 7.48 7.49 7.50	8.00
Denera, Pa. A5 Duloth A5 Fairfield, Ala T2 Galveston D4 Houston S2	152 152 157	162 162		173 173	178	7.40	7.80 7.80 7.80
Johnstown, Pa. B3° Joliet, Ill. A5 Kokomo, Ind. C9 Les Angeles B2°	152 152 154	166 162 154		173	175 175 177	7.40 7.40 7.50	7.80 7.80 7.90 8.92
Kansas City S2 Minnequa C6 Monessen P6 Moline, Ill. R3	. 167 157 157	163	162	178	180	7.65 7.65 7.40	8.05 8.05 7.80
Pittaburg, Cal. C7 Portsmouth P7 Rankin, Pa. A5 So. Chicago R3	17	181		111	191	7.40	7.88
S. San Francisco C6. Sparrows Pt. B3° Struthers, O. Y1 Worcester A5	15			17	181	7.50	8.75 6.07 7.90
Williamsport, Pa. 55			160	0			

Galvanised products computed with sinc at \$4 per lb. Exceptions: "sinc at 12.5¢ per lb; "*13¢ sinc.

C-R SPRING STEEL

		CARB	ON CO	NTEN	r
Cents Per Lb F.o.b. Mill		0.41- 0.60	0.61-	0.81- 1.05	1.06-
Buffale, N. Y. R7 Carnegie, Pa. S9 Cleveland A5 Detroit D1 Datroit D2 Harrison, N. J. C11 Indianapolis C5 Naw Castle, Pa. B4 Naw Haven, Cann. D1 Pavtucket, R. I. N7 Pittsburgh S7 Riverdsle, Ill. A1 Sharon, Pa. S1 Treetion R4 Wallingford W1	7.00 7.10 7.11 7.11 7.00 7.41 7.51 7.60 7.10 7.00	8,95 8,95 9,05 9,05 9,10 8,95 9,25 9,25 8,95 8,95 8,95 8,95	10, 50 10, 50 10, 60 10, 60 10, 60 10, 50 10, 50 10, 50 10, 50 10, 50	12.95 12.95 12.65 12.65 12.65	15.35 15.35 15.46 18.35 15.46 15.31 15.31
Warren, Ohio 74 Weirten, W. Va. W3 Worcester, Mass. A5 Youngstown C5	7.16	8.95	10,50 10,50 10,80 10,50	12.65 12.95 12.65	15.61

BOILER TUBES

S per 100 ft, carload	Si	ie.	Sean	nless	Elec.	Weld
fots, cut 10 to 24 ft F.o.b. Mill	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Bahcock & Wilcox	2 21/6 3 31/6 4	13 12 12 12 11 10	41.57 47.99 56.03	49.16 56.76 66.27	29.94 49.31 46.54 54.34 72.16	
National Tobe	2 21/2 3 31/2 4	13 12 12 12 11	42.57 47.99 54.03	49,16 54,76 66,27	29.94 40.31 46.54 54.31 72.16	
Pittaburgh Steel	2 21/2 3 31/4 4	13 12 12 11 10	41.57 47.99 56.03	36,51 49,16 56,76 66,27 88,06		

Miscellaneous Prices

(Effective Oct. 18, 1955)

TOOL STEEL

F.o.b.	mill				
W	Cr	V	Mo	Co	per 1b
18	- 6	8	course	-	\$1.60
1.8	4	1	-		2.305
1.8	4	9	-	-	1.765
1.6	4	1.5	. 8	-	.94
6	4	3	6	-	1.35
6	6	2	6	_	1.106
High-	carbon (chromi	um		77
	ardened				
	al carbo				
	carbon				
Regu	iar carb	prices	on an	d enst	of Mis-
	pi are asippi, 6			gher.	West of

CLAD STEEL Base prices, cents per lb. La.b.

		Plate	Shoet (12		
	Cladding	10 pct	15 pet	20 pcl	20 pcl
	304	30.30	33.15	36.85	32.50
1	316	35.50	38.45	41.40	47.66
Statement 179	321	32.60	34.85	37.75	37.25
Ĭ	347	34.40	37.90	41.40	48.25
ä	405	25.80	29.60	33.35	
	410, 430	25.30	29.10	12.85	

CR Strip (89) Copper, 10 pct, 2 sides, 48.00; 1 side, 30.00.

LAKE SUPERIOR ORES

\$1.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.
Gross Ton
Openhearth lump \$11.26
Old range, bessemer 10.40
Old range, nonbessemer 10.26
Mesabi, bessemer 10.36
Mesabi, nonbessemer 10.10
High phosphorus 10.00

COKE

Furnace, beehive (f.o.b. oven) Conneliaville, Pa \$13.00	Net-Ton
Foundry, beehive (f.o.b. oven)	410.00
Connellaville, Pa \$16.00	to \$16.50
Foundry, oven coke	
Buffalo, del'd	\$28.08
Chicago, f.o.b.	25.78
Detroit, f.o.b.	26.25
New England, del'd	26.05
Heaboard, N. J., f.o.b.	25.50
Philadelphia, f.o.b.	25.00
Bwedeland, Pa., f.o.b.	25.00
Plainesville, Ohio, f.o.b	
Erie, Pa., f.o.b.	28.00
Cleveland, del'd	27.41
Cincinnati, del'd	36.60
Bt. Paul, f.o.b	38.7
St. Louis, f.o.b.	
Birmingham, f.o.b.	
Lone Star Tex fob.	19.50

ELECTRODES

Cents per 1b, f.o.b. plant, threaded, with nipples, unboxed.

G	RAPHITE			CARBON*	IBON*				
Diam. (in.)	Longth (in.)	Price	Diam. (In.)	Length (in.)	Price				
24 20 16 to 18 14 12 10 7 6 4 3	84 72 72 72 72 72 72 80 80 40 40 40 24	23.60 22.25 22.50 23.00 23.50 24.25 24.80 27.25 30.25 32.06 33.75 52.50	40 25 30 24 20 17 14 12 10 8	100, 110 110 110 110 72 to 84 90 72 72 72 72 80 60	9,00 9,90 10,05 10,30 10,10 10,35 10,85 11,75 11,86 12,16				

^{*} Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base	diagoni	mé	tob	m 471)
/ Without	TO SERVICE AND ADDRESS OF THE PERSON NAMED IN COLUMN TWO IN COLUMN TO SERVICE AND ADDRESS OF THE PERSON NAMED IN COLUMN TO SERVICE AND ADD	170.07	1.0.0.	120 200 V

Machine and Carriage Bolts	
D	iscount
Less Case	C.
16 in. & smaller x 4 in. & shorter	17
1/2 in. & smaller x 6 in. & shorter +12	11
9/16 in. & % in. x -6 in. & shorter+13 % in. & larger x 6 in. &	10
shorter	7 net
Rolled thread carriage bolts	ne.
shorter	12
shorter	18
6 in+11	12
Plow bolts 18	1.8
Nuts, H.P., C.P., reg. & hvy.	lacount,

%" or smaller		Case or Keg 64 63 65 61
C.P. Hex. regular & hvy %" or smaller %" and larger	5.5 5.1	64 61
%" or smaller %" to 1 %" inclusive	38 36	50 49

Finished, Semi-finished, Slotted or Cas-tellated Nuts % " and smaller 55 66

% and	urkar		 9.7	
Rivets				
1/ In an	A lanna		Base p	er 100 lb
1/2 in. an	id mr.Re	H	 Pol	Of List
7/16 in.	and sr	naller	 	. 32

Cap Screws

		ount H.C. Heat
		Treated
New std. hex head, pack- aged		
%" thru %" diam. x 6" and shorter	84	20
9/16 and %" x 6" and smaller and shorter %", %", 1" x 6" and	31	16
shorter New std. hex head, bulk		+11
%" thru %" diam. x 6" and shorter	4.9	41
9/16" and %" diam. x 6" and shorter	48	39
shorter Minimum quantity pe	. 31	20
15,000 pieces ¼", 5/16", 5,000 pieces 7/16", ¼", 2,000 pieces ¼", ¼", 1	%" di 9/16", " diam.	am. %" dian

Machine Screws & Stove Bolts

			Diac	Sano
De des made o	analana M		Mach. Screws	Bolts
Packaged, Bulk, bulk	list		21	
14 Pm	Quar	ittiy		
4 -in. diam. & under	25,000-2	00,000	20	61
5/16-in. diam. &	15,000-1	00,000	20	61
All diam. over 8 in. long	6,000-1	00,000	-	61

Machine Screw & Stove Bolt Nuts

		Die	count
Packaged, Bulk, bulk	package list	Hex 24	Square 27
%-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingh	am	١,			9								0	0			a			. 109.8
New Yor	к.																_			. 121 6
Chicago																			_	122.9
San Fran	ncia	CO	-	L		A					0	0			0					. 131.1
																				heavier.
6 in. or	lar	g e	F.		b	el	ž		2.9	14	ĩ	4	'n	οÃ	a	n	ě		49	ine Ex-
planation	12	D.	1	61	Ý.	1	Ŕ	es	n É			i		4	ě	H	ŭ	e	*	Source :
U. B. Pip		<u> </u>	a.	-	v.	_		-4		•		a			•	9.1	-	•		Domice.

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., (except Salina, Pa.,	Md., Mo., Ohio, Pa.
No. 1 Ohio	Ky., Mo., III. 114.00
No. 2 Ohio	on, bulk (ex-
cept Salina, Pa., add	1 \$1.50) 18.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala	128.00
Childs, Hays, Pa.	133.00
Chicago District	138.00
Western Utah	
California	
Hays, Pa., Athens, Tex., Wind-	
ham	145.00
Curtner, Calif.	163.00
Slika cement, net ton, bulk, East-	
ern (except Hays, Pa.)	21.00
Pa.	24.06
Silica cement, net ton, bulk, Chi-	#4.00
cago District, Ensley, Ala	22.00
Silica cement, net ton, bulk, Utah	
and Calif	

Chrome Brick Standard chemically bonded, Balt. \$86.00 Standards chemically bonded, Curtner, Calf. 96.25 Burned, Balt. 80.00

Magnesite Brick

Standard Baltimore Chemically bonded,	Baltimore		97.50
Grain Magnesite	St.	% -in.	grains

in bulk Domestic,	fines	Baltimore removed Chewalah,	Wash.	\$64.40	
Luning, in bulk				40.00	

Dead	Burn	ed	Dole	D ITT	Ē1	h	•						1	P	81	r	net ton
F.o.b.	bulk	, P	rodu	ci	n	8		p	ol	n	Ł	В		8	n	2	
Pa.,	W.	Va.	Ohl	lo		0							0	D	0		\$15.00
Mid	west					0	0	0.			A		0				15.60
Miss	ouri	Va	liey	9.0		0.	0	0.1	0, 0		0	0		0	0	v	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, lots, for minus 100 mesh. Swedish sponge iron c.i.f.	in ton
New York, ocean bags	11.254
Canadian sponge iron.	9.54
Del'd in East, carloads	110.754
Domestic sponge iron, 98+%	(10.108
Fe, carload lots	0.54
Floring with the annealed	9.54
Electrolytic iron, annealed,	87.54
imported 99.5+% Fe	27.54
domestic 99.5+% Fe	36.54
Electrolytic iron, unannealed,	
minus 325 mesh, 99+% Fe	53.54
Hydrogen reduced iron mi-	
nus 300 mesh, 98+% Fe. 63.0	# to #0.0#
Carbonyl iron, size 5 to 10	
micron, 98%, 00.8+% Fa. 83.0	
Aluminum	31.54
Brass, 10 ton lots 29.50#	
Copper, electrolytic	67.754
Copper, reduced	57.75e
Cadmium, 100-199 lb. 95¢ plus me	tal value
Chromium, electrolytic, 99%	
min., and quality, del'd	\$3.60
Lead	23.50∉
Manganese	67.0∉
Molybdenum, 99%	\$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50€
Nickel, spherical, unannealed	93.504
Silicon	43.50¢
Silicon Bolder powder 7.0¢ to9.0¢ plus n	net. value
	0.7.00
Stainless steel, \$16	\$1.10
Tin	tal value
Tungsten, 99% (65 mesh)	\$4.50
Zinc, 10 ton lots	# to 25.0#



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STEEL SHOT & GRIT CO.
Boston, Mass.

Ferroalloy Prices (Effective Oct. 18, 1955)

Ferrochrome Contract prices, cents per lb contained Cr., lump, bulk, carloads, del'd, 67-71% Cr., 130-1.00% max. Sl.	Spiegeleisen Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.	Alaifer, 20% Al. 40% Bi, 40% Fe, Contract basis, f.o.b. Suspen- sion Bridge, N. Y., per lb. Carloads	35∉
0.02% C 38.50 0.20% C 35.50 0.05% C 35.50 0.00% C 35.50 0.00% C 35.50 0.10% C 36.00 1.00% C 34.00 0.15% C 35.75 2.00% C 33.75 4.00-4.50% C 57.64% Cr, 2.00-4.00% S 35.55 0.00% C 57.64% Cr, 2.00-4.00% 35.00	Manganese Silicon 16 to 19% 3% max. \$86.00 19 to 21% 3% max. \$8.00 21 to 23% 3% max. 90.50	Ton lots 11.6 Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo	.28
0.15% C 35.75 2.00% C 33.75 4.00-4.50 C, 67.70% Cr, 1-2% H1 36.25 35.0-5.00% C, 57-64% Cr, 2.00-4.00% H1 35.00	Manganese Metal Contract basis, 2 in. x down, cents per pound of metal, delivered.	Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.	
S. M. Ferrochreme Contract prices, cents per pound, chro-	pound of metal, delivered. 95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe. Carload, packed	Less ton lots	5.90 5.95
mium contained, lump sise, delivered. High carbon type: 60-65% Cr, 4-6% 61, 4-6% Mn, 4-6% C. Carloads	Ton lots	Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta \$4. Ferromolybdesum, 55-75%, 200-lb	1.65
Ton lots	F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound. Carloads	Pa., per pound contained Mo \$1.	.46
High Nifrogen Ferrochrome Low-carbon type 0.75% N. Add 3¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional	Ton lots	Ferrophosphorus, electric, 22- 26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton \$30 10 tons to less carload \$110	0.00
0.25% of N.	Medium Carbon Ferromanganese Mn 80% to 85%, C 1.25 to 1.50, Si 1.50%	Perrottianium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots,	
Chromium Metal Contract prices, per lb chromium con- tained, packed, delivered, ton lots, 97% min. Cr. 1% max. Fe.	max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn 31.85	per in contained Ti	1.35
min. Cr. 1% max. Fe. 0.10% max. C	Contract price, cents per pound Mn contained, lump size, del'd Mn 85-20%.		1.50
Low Carbon Ferrochrome Silicon (Cr 34-41%, 81 42-45%, C 0.05% max.)	0.07% max. C, 0.06% P, 90% Mn 22.00 33.85 25.05 0.17% max. C 29.95 31.80 32.80	Less ton lots	1.50
(Cr 34-41%, 81 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per ib of Cr, packed. Carloads 41.85 Ton lots 46.15	0.07% max. C, 0.06% P, 90% Mn . 22.00 33.85 35.05 0.17% max. C . 29.95 31.80 33.80 0.15% max. C . 26.95 28.80 30.00 0.50% max. C . 26.95 28.80 30.00 0.50% max. C . 26.95 28.80 39.50 0.75% max. C, 80-85% Mn, 5.0-7.0% B1 . 23.45 25.30 26.50	Ferrotungsten, ¼ x down, packed, per pound contained	
Calcium-Silicon	Silicomanganese	Molybdie oxide, briquets, per lb	1.27
Contract price per lb of alloy, lump, delivered, packed. 20-23% Cr. 60-65% Sl. 2.00 max. Pe. Carloads	Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢. Carload bulk	bags, f.o.b. Washington, Pa.,	1.24
Calcium-Manganese—Silicon Contract prices, cents per lb of alloy,	Ton lots 12.65 Briquet contract basis carloads, bulk, delivered, per lb of briquet	Carload, bulk lump 18 Ton lots, packed lump 16 Less ton lots, lump packed. 17	5.50 6.75 7.25
lump, delivered, packed. 16-20% Ca, 14-18% Mn, 63-59% 81. Carloads 23.05 Ton lots 24.95 Less ton lots 25.95	Silvery iron (electric furnace) 84 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$90.00 gross ton, freight allowed to normal trade area.	Vanadium exide, 86 - 89 % V ₂ O ₃ contract basis, per pound contained V ₂ O ₃	1.3
SMZ Contract prices, cents per pound of alloy.	N. Y., \$90.50. Add \$1.00 per ton for each additional 0.50% Sl up to and including 17%. Add \$1.46 for each 0.50% Mn over	35-40%, f.o.b. freight allowed, carloads, packed 26 12-15%, del'd, lump, bulk-	5.25 8.50
delivered, 60-65% Si, 5-7% Min, 5-7% Zr. 20% Fe ¼ In. x 12 mesh. Ton lots 19.65 Less ton lots 20,90	1%. Silicon Metal	Boron Agents	
V Foundry Alloy	Contract price, cents per pound con- tained Si, lump size, delivered, packed. Ton lots Carloads	Boresil, contact prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained 2 \$	\$5.2
Cents per pound of alloy, f.o.b. Sussion Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed. Carload lots 16.60	96.50% SI, 2% Fe 22.75 21.45 98% SI, 1% Fe 23.25 21.95 Silicon Briquets	Bertam, f.o.b. Niagara Falls Ton lots, per pound Less ton lots, per pound	45
Ton lots	Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 ib Si briquets.	Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y.,	
Graphidex No. 4 Cents per pound of alloy, f.o.b. Suspension Bridge, M. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%,	Carloads, bulk 6.75 Ton lots, packed 9.25	freight allowed Ton lots per pound 10 Ferroboron, 17.50% min. B, 1.50% may Si 0.50% may Al 0.50%	0.00
max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%. Carload packed	Electric Ferrosilicon Contract price, cents per ib contained Si, lump, bulk, carloads, delivered.	F.o.b. Wash., Pa.; 100 lb up 10 to 14% B	1.3
Less ton lots	50% 81 11.75 75% 81 15.40 65% 81 14.50 85% 81 17.10 90% 81 18.50	14 to 19% B	1.5
Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn. Cents	Calcium Metal Eastern sone contract prices, cents per	No. 1 No. 79 Manganese - Boron, 75.00% Mn.	\$1.6
Producing Point Marietta, Ashtabuia, O.; Alloy, W. Va.; Sheffield, Ala.; Portland.	pound of metal, delivered. Cast Turnings Distilled Ton lots \$2.05 \$2.95 \$3.75 Less ton lots 2.40 3.30 4.55	15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.	81 4
Ore. 9.50 Clairton, Pa. 9.50 Sheridan, Pa. 9.50 Philo, Ohio 9.50	Ferrovanadium		1.0
Add or subtract 0.1g for each 1 pct Mn above or below base content. Briquets, delivered, 66 pct Mn: Carloads, bulk	50-55% V contract, basis, delivered, per pound, contained V, carloads, packed. Openhearth	Silens, contract basis, delivered.	\$2.0
Ton lots packed 14,30	High speed steel (Primos) 3.30	Ton lots 4	5.0

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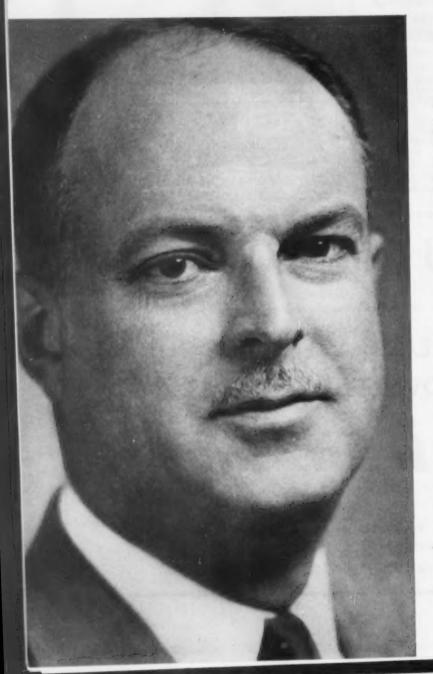
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"John, how do you feel about these new services we've lined up for Iron Age advertisers for 1956?"

... asked of John DeWolf, Vice-President, G. M. Basford Co., leading industrial advertising agency



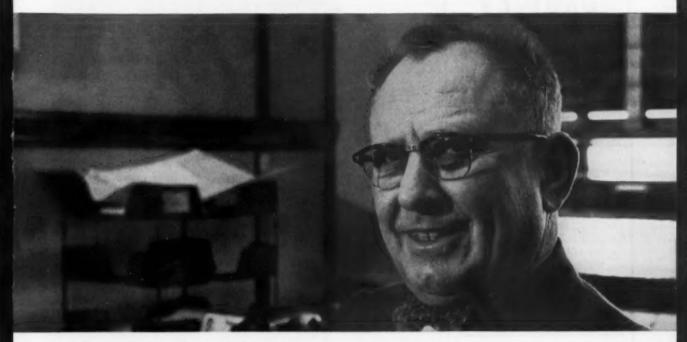
"I welcome them. I'm sure they will prove very valuable to us — and to our clients. To me, business-paper leader-ship requires more than just good editorial content and a good circulation statement. To be a leader a paper must also help the advertiser with his advertising and marketing problems. Your new services are a stepping up of this kind of help by a paper that is, of course, a recognized leader."

"What part of this Advertiser Service Program means the most to you, John?"

"Your new advertising readership studies — your Mills Shepard reports. As you well know, I'm convinced that this type of research can show us how to produce more effective advertising — and I'm delighted that Mills Shepard, whom I regard very highly, is making these studies for you. In such an important field as the metalworking market, we need all the help of this kind that we can get."

"What about the Shepard Copy Seminars?"

"They're an extremely valuable part of Mills Shepard's service. The Reports tell us how we've done. It is from the seminars that we'll learn why. If you can get a group of ad men discussing actual readership scores—under the guidance of an expert like Mills—then you really begin to see what readers are looking for. You learn why some ads get high readership and others on the same class of products don't do so well. Learn that, and you learn how to make your advertising really effective,"



Next, we talked to Leon J. Lieberman, Advertising Manager, Alan Wood Steel Co.

"I'm with you all the way, but I'm most impressed with what you call 'readership stimulation.' Those new editorial front covers, highlighting what's hot in metalworking — they pack a wallop. I'm intrigued by the way you've pointed up the content to your four reader functions. The whole idea is alert, progressive. And then, when you showed me how you're going to go even further, and reach out to the reader so he'll reach out even faster for the current IRON AGE — I'm very impressed. You're one of the very first business papers to do this kind of reader promotion."

Ask your IRON AGE representative for the full, interesting story of this new Advertiser Service Program.

the Iron Age

CHESTNUT & 56th STREETS, PHILADELPHIA, PA.







Then, we quizzed Joe Vinbury, General Sales Manager, Abrasive Machine Tool Co. . . .

"Like the program? Emphatically, yes! It represents a valuable service to advertisers. What rings the bell most with me? Your Market Research Seminars under Oliver Johnson's direction. I've worked with Oliver and your research people in the past. Market research help is essential for someone in my position. Now, if I have the chance to sit in a room with other sales and marketing men with similar problems, and with Oliver to keep us on the beam, we trade experience back and forth — yes sir, that's for me!"

RAILWAY EQUIPMENT

FOR SALE

Used - As Is - Reconditioned

RAILWAY CARS

All Types

"SERVICE-TESTED"

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline, Diesel-Electric

1-80-Ton, 0-6-0

LIMA STEAM SWITCHING LOCOMOTIVE

Excellent I.C.C. Condition

RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon Cleaned and Tested

CRANES

Overhead and Locomotive

RAILS

New or Relaying

IRON & STEEL PRODUCTS, Inc.

General Office 134% S. Brainard Ave. Chicago 33, Illinois Phone: Mitchell 6-1212

New York Office 50-b Church Street New York 7, N. Y. Phone: BEekman 3-8230

"ANYTHING containing IRON or STEEL"

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Pittsburgh Prospers . . . Rolling right along in the wake of record steel production, used and rebuilt machinery dealers are experiencing prosperous times.

Their prosperity is basically the result of two things: first, the normal increase of business in a rising economy and second, the large increase of breakdowns caused by record-straining production of the steel producers and their consumers.

The big headache for dealers is locating equipment to fill inquiries. The volume of business in most cases is limited only by the size of the dealer's inventory.

There are cases of dealers having sold equipment before it is actually in their hands while the original user is waiting for replacement equipment which, both new and used, is running far behind delivery schedules.

Stress Service . . . While the customer still requires utmost service from the dealer, he has relaxed somewhat on getting specific specifications due to the low dealer stocks.

If a piece of equipment meets the general requirements of the customer, he is apt to grab it. In some instances this means a lot of rebuilding and altering before he has exactly what he wants. The same is true of older equipment which is moving freely for reasonable prices.

Crane Sales Hold . . . Crane sales have stayed at the high level established during the first two months of the third quarter, making this quarter the best of 1955. If a better selection of cranes were available the picture would be even brighter. Inquiries are coming from all points, both domestic and foreign, and for all types of AC and DC cranes including substantial inquiries for locomotive and truck cranes.

Steel mill equipment continued to move along the lines of the stepped-up pace recorded in August and here too the third quarter topped the good results recorded during the first two quarters of 1955. The trend remained strongly on the side of heavier, complete mill installations and forecasts for the fourth quarter are every bit as good.

Electric Models Move . . . Electrical rebuilders report sales of equipment for the third quarter running about the same as for the first two quarters of the year or 27 pct higher than sales a year ago.

Third quarter profits are reported up over the first half of the year with efficient operations enabling rebuilders to handle the increased work load with a minimum increase in work force.

Tool Trade Uneven . . . The used machine tool trade continues to have its ups and downs, but the average sales picture for 1955 is keeping all the dealers happy. As a general rule, if business is off one week it snaps back strongly before the next week or two.

While one dealer will report a slow month, the next dealer will be selling at top speed. The best indication of business pickup is the status of the small machine shop which in September showed their best business gain in two years. As the overflow of work from the larger shops continues to run their way, the small shops anticipate a good fourth quarter and perhaps, the beginning of the road back.

With steel production being maintained at highest possible levels, heavy maintenance, repair and replacement will continue and with it the used and rebuilt machinery trade will also have to keep stepping to find the right models.

CONSIDER GOOD USED **EQUIPMENT** FIRST

ANGLE BENDING ROLLS
No. 8 Niagara Angle Bending Rell
No. 2 Buffale Angle Bending Rell
8ALER
#136-TC Galland Hemping Volume

Me. 2 Buffals Angle Bending Roll

ALER TO Galland Homning, Volume of Box 145 cu.

Blas Shange to 800 the.

Bris Shange to

DIEING MACHINE

25 ton Hanry & Wright, 114" Stroke, Double Bell
Feed, Strap Mear
Pred, Strap Mear
Pred, Strap Mear
Pred, Strap Mear
Possible Standard Double Draw, 48' Length of Draw
Possible MacHines
An Astonal
4", 5", 714" National High Duty, Air Clutch
FURNACES
Lee Wilson Natural Gas Annealing Furnace, Work
Dimensions 43" col., 96" Pilling Height
Westinghouse Bell Type Furnace, Gas Fired, Charge
Space 36" dia x 42" deep Model 1409
The Market Medical Medica

72" McKay 15 Rolls 4\(\frac{1}{2}\) Dia.

785 HESSES - HYDRAULIC
250 ton RD Wood liydr. Joggling Press
550 ton RPM Featraverse Press, 24" Stroke Press
1280 ton Birdsbord - Column, 29" Stroke Dist. Bet.
Columns 59" x 36" Daylite 42"
1250 ton Birdsbord - Column, 29" Stroke Dist. Bet.
Columns 59" x 36" Daylite 42"
1251 ton Baidwin Southwark Forging Press, 80" Stroke
Main Ram, 54" x 41" Heb. Column
2645 ton Birdsbord.
4500 ton B-LeH Hydr. Forging Press

PUNCH & SHEAR COMBINATIONS

Style EF Cleveland, 36" Throat, Punch 14" thru 1"

Style W Cleveland Single End, 88" Throat, 313 Tun

ROLL-PLATE STRAIGHTENING

64" Hilles & merc. Siz Bolls 16" Dia., M.D.

10 L. Ha Billion & W.-F Two Stand Two High
13" x 20" deartion & W.-F Two Stand Two High
13" x 24" Garrison Single Stand Two High
13" x 24" Garrison Single Stand Two High
10" x 24" Farrel F&M Two Stand Two High
20" x 20" Hoagiand Single Stand Two High
30" x 24" Garrison Two High Hot Mill

84" x 14" Garrison Two High Hot Mill

84 EARS—GATE
4" X 10" Mackintosh-Hemphill

54 EARS—BAR

85 HEARS—BAR

87 BUSINS Bar Cutter, Capacity 3" 84, 3%" Rd.

84 HaJ Guillotine Type Bar Shear Capacity 3%"
Square, 4" Sound

SP Baralo Cutter, Capacity B" Bq., 8%" Rd. ### Rd.

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Manufacturing

Confidential Certified Appraisals Liquidations - Bana Fide Auction Sales Arranged

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A. T. HENRY & COMPANY, INC.

Equipment

Consulting Engineering Service

WORLD'S LARGEST STOCK STAMPING PRESSES

BLISS . CLEARING . CLEVELAND FERRACUTE . HAMILTON . L & J. NIAGARA . TOLEDO . V & O.



SQUARING SHEARS . PRESS BRAKES REBUILT and GUARANTEED

JOSEPH HYMAN & SONS

TIOGA, LIVINGSTON & ALMOND STS. PHILADELPHIA 14, PA. Phone Garfield 3-8700 _____

IMMEDIATE DELIVERY

BLISS #96 ½-72 Double Grank Press 600 Ton Cap., Bed 72" x 55" BLISS-TOLEDO #95C Double Grank Press 250 Ton Cap., Bed 60" x 40" Beth Acce Air Clutch, Air Cuchion, Air Counter Halance & are Still Bet Up in Operation

CLEARING #K-1200-30 Knuckle Joint 200 Ton Cap., 4" Stroke Air Clutch TOLEDO #853A Knuckle Joint 400 Ton Cap., 9½" Stroke Air Clutch

50 CHURCH ST, NEW YORK CITY 8 Telephone COrtlandt 7 3437

Surplus Mfg. Equipment Inventories Purchase

Pastern Rebuilt Machine Tools THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

BALL BEARING DRILLS

BALL BEARING DBILLS

No. 2 Avey Single Spindle, m.d.
No. 4 Fosdick, B" overhang, High Speed, m.d.
No. 15 Buffalo Floor Model, m.d.
No. 18 Canedy Otho Bench Model, m.d.
No. ½, 1, 2 Avey, belted m.d.
No. 18 Edlund, m.d., new
No. 2 Avey Single Spindle, m.d.
2 spindle Allen, belted m.d., B" overhang
No. 2LMS Leiand-Gifford, single spindle, High

No. 2LMS Leland-Gifforo, smy.
Speed, m.d.
2 spindle Avey, size No. I, type B, style VHP,
m.d., B" overhang
m.d., B" overhang spindle Avey, size No. I, type B, style VHP, m.d., B" overhang spindle No. 3MA6 Avey High Speed, m.d. spindle No. 2MA6 Avey High Speed, m.d. spindle No. 2 Letand & Gifford High Speed, B" overhang, m.d.

8" overhang, m.d. spindle Leland & Gifford #ILMS—High Speed,

late, m.d. spindle Leland & Gifford High Speed, Model m.d.

ama, m.d.
4 spindle Leland & Gifford, m.d. on each
spindle
6 spindle Leland & Gifford, m.d. on each
spindle, No. 2 Taper
HORIZONTAL DRILLS
1 May Marke Market 10.111

way Natco Horizontal Drill, consisting of 3 E13 Holeunits

Ro. 1/2 billow Prett & Whitney 2 spindle Deep Hole Reaming Machine, m.d.
No. 1/8 billow Prett & Whitney Gun Barrel Riffling Machine, m.d.
No. 18 billow Prett & Whitney Gun Barrel Riffling Machine, m.d.
No. 18/16" Prett & Whitney 2 spindle Deep Hole Reaming Machine, m.d.
No. 11/16" Prett & Whitney 2 spindle Gun Barrel Riffling Machine, m.d.
No. 1 Prett & Whitney 2 spindle Deep Hole Drill, belted m.d.
Model 410 W. F. & John Barnes 2 spindle Hydraulic Deep Hole Drill Sharpener, m.d.
MULTIPLE SPINDLE DRILLS
3 spindle 24" Barnes All Geored Self-Olling, m.d.
Tiblu Moline Multiple Spindle Drill Press
No. 1 & Baush, 20.46" head, m.d.
3 spindle 28" Cincinneti Bickford Upright Drill, m.d., No. 4 M.T.
4 spindle N-B-F, m.d., 12" rall, No. 5 Taper
No. 728 Barnes Vertical Drilling, Boring, Facing & Reaming Machine
6 spindle W.F. & John Barnes Vertical Drilling Machine, m.d.
No. 16 Scote-Burt Fixed Center, m.d.
3 spindle Rockford 12" Gang Drill, m.d.
26" 2 spindle Floor Drill, m.d.
26" 2 spindle Floor Drill, m.d.
26" 2 spindle Floor Drill, m.d.

We carry an everage stack of 2,000 machines in our 11 area pleas at Cincipanti. Visitars welcome at all times.

THE EASTERN MACHINERY COMPANY

1002 Tennessee Avenue, Cincinnati 29, Ohio CABLE ADDRESS-EMCO

MElrose 1241

I-STEAM HAMMER 6000 & Dblc. Frame 52" Streke

FORGING HAMMER 120005 Dbfo. Frame 52" MANY SPARE PARTS AND TOOLS, ETC.

ALSO Car bottom and batch furnaces, BROBIUS charger, 72" COLD saw, 18" MARVEL hydraulic hack sow, etc., etc.
ALSO 2006 ton UNITED steam hydraulic intensifier

ALL MUST BE SOLD AND REMOVED WITHIN SO DAYS FROM MAJOR PLANT ADDRESS BOX G-166 Care The Iron Age, Chestnut & 56th Sts., Phila. 29 Car type Annealing Furnace, annealing chamber 33' lg. x 6' wide x 6' high above bottom of car; gas fired, equipped.

1-Bar & Rod Mill; 7 double stands of 12" rod mill with extra rolls, no drives or electrics.

I-Electric Scale car, 100' cap. 71/2 ton, side dump, motor.

I—Brosius Floor type Charging Machine, 6000# cap. gasoline engine driven.

Lou F. Kinderman Box 182 - Niles, Ohio . Phone OL 2-9876

"If It's machinery we have It." NATIONAL MACHINERY EXCHANGE

New York 13, N. Y. GAsol 4-2470



FOR SURPLUS STEEL PLANT EQUIPMENT

& CO. INC.

8—Bar and Red Mill—Cress Country, 2 stands 18" x 60" 3-Hi Rougher, 3 stands 12" x 32" 3-Hi Intermediate, 6 stands 10" x 24" 3-Hi Finishing and 1 stand 10" x 24" 2-Hi Finishing. Complete with Shears, Guides, etc., and all Electric Drives.

1-15" Wide Continuous Hot Strip Mill, 8 stands continuous, 4 stands cross country, complete with Furnace, all Electrics, Main Drive Motor, Hot Bed and Shears.

Write for the Curry List of available steel plant equipment

-20"/24" Wide Continuous Strip and Plate Mill. Motor Driven throughout, including all Electrical Equipment and Furnaces. For rolling slabs 20"/24" x 3" x .065" finished gauge. Annual capacity 150,000 tons.

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STEEL PLANT EQUIPMENT

941 OLIVER BUILDING - PITTSBURGH 22, PENNA.

Phone ATlantic 1-1370

10' down to plate or strip from 1" to

1-25" & 42" x 66" 4-Hi Reversing Hot Strip Mill, including Housings, Pinion Stand, Gear Reducer, Chocks, Bed Plate and Motor Driven Screwdown.

1—2000 HP GE Slip Ring Motor, 237 RPM, 3 phase, 60 cycle, 2300 Volts, complete with all controls and Forced Air Cooling System.

1—144" x 3/16" Stamco Power Squaring Shear, Spring Activated Holddown and Spring Top Knife Balance. Rebuilt and Cuaranteed

2-2000 HP Mesta Gear Reducers, Ratios 10 to 1 and 7.375 to 1.

Cable Address: CURMILL-PITTSBURGH

SELECT MACHINE TOOLS

GRINDING MACHINES

- No. 2 Cincinnati conterios, Simatio.

 40" No. 66A2 Blanchard 2-opd. rotary, new 1948.

 72" Colonial broach grinder. Late
 72" Manchett 3-spd. rotary surface, new 1946.

 73" x 40" Norion universal cylindrical, late.

 10" x 80" Landis pag type sylindrical, new 1941.

 19" x 90" Model 500 Manchett vert. spdl., 1948.

 10" x 24" Cincinnati byd. universal cyl., filmatic.

HAMMERS

No. 6-1 Nazel, pneumatic, into No. 5N Nazel, self-contained, No. 6B Nazel, self-contained,

LATHES

LATHES
No. 5 Joocs & Lamous ram type usly, turret
14" x P Nemdey Yostroom, 1960,
15" x 18" Lipe Corbe-Mello, 1942,
9" x 18" Henday Pro., Tool & Gauge, 1940.

MILLS

Math.s.
1-16 Cincinneti production.
Medici 2-30 Kont-Owens hyd. mill.
1-2-3-4-5-6 knoc type plain & vertical.
00" x 46" x 10" toperool adj. rail planer type.
No. 2N K & T plain horiz., new 1942.

PLANERS 38" x 66" Rockford Hyd. Openside Shaper-Planers.

PRESSES

PRESSES
113 ton No. 78 Tolodo gap frame, 8,8,
380 ton No. 780%-72 Tolodo D.C., Teggin drawing,
380 ton No. 780%-72 Tolodo D.C., Teggin drawing,
500 ton No. 1019 Hamilton D.C., 23, bod, 60"zi62",
500 ton No. 1019 Hamilton D.C., 23, bod, 60"zi62",
545 ton No. 1019 (Amilton Poreling Presse)
1050 ton No. 656 Tolodo ceiming or furging.

SHAPERS

20" Rockford "Ny-Draulie" universal 32" G & E Invincibio, F.M.D., tate type.

UPSETTERS

2" National Upsetter 3% " Ajax, suspended slides, sleel frame. 5" Ajax, suspended slides, sleel frame.

1000 Tools in Stock

Free Illustrated Catalog

MILES MACHINERY CO.

Phone Saginaw 2-3105 Suginaw, Mich

ROLL GRINDERS

2-36" x 240" CINCINNATI

Traveling Wheelhead

Filmatic Bearing-Hydraulic Feed Crowning Attachment-Motors-Controls

IN STOCK - REBUILT

LANG MACHINERY COMPANY

Pittsburgh 22, Pa.

FOR SALE VERTICAL HOIST

BARTLETT & SNOW DESIGN

Steel Structure, Platform, Wire Ropes, Sheaves, Hoist, Motor, Spare Motor, Controls.

OPERATING HEIGHT 93'-3" CAPACITY 4 TONS

Elevator Platform sized to accommodate 50 cu. ft. Rocker Dump Cars. Good operating condition, available "as is—where is"—"as found."

For further particulars contact works a

NATIONAL CARBIDE CO. IVANHOE, VIRGINIA

3¾" Late Type Defiance Horizontal Table Type Boring Machine Serial #921-39

#24 Tri-Way 3" Universal Boring Mill Serial

2 3-4 Spindle Leland Gifford Drills

#300 Hanchett Vertical Surface Grinder Serial #300-17

DB 2112-A Excello Single End Borematic Ser.

#47 Heald Single End Borematic Serial #4646 (2) Greenfield #28 Hydraulic Internal Grind-ers Serials #1-11-11902 and F4-11235

7A Jones & Lamson Turret Lathe Serial #60469 #72A 3 Heald Sizematic Internal Grinders Serial #12276

Late Type 12" x 48" Landis Type C Universal Hydraulic Cylindrical Grinder Ser. #17878 (2) 24' x 8' x 10" Thick T slotted Floor Plates (2) 20' x 6' x 14" Thick Layout Plates. Plain no T slots.

HAZARD BROWNELL MACHINE TOOLS, INC. St. Providence 6, R. I. Dester 1-8880 350 Waterman St.

COMPRESSOR DIRECTORY World's Best Rebuilts

12.7 CFM 1900 P51 Ing. Rand Model 41 GS DFM 190 P81 7 x 6-1R-CPT-Fean 150 F81 7 x 6-1R-CPT-Fean 175 CFM 240-350 P81 5 x 5-1 N 192 XRE 3-80-2300 175 CFM 190 P81 9 x 8 Ing. CPT-Amer. 252 CFM 3500 P81 Worth. (4) stage H84 254 CFM 122 P81 10 x 10 Worth. X-D 283 CFM 3500 P81 10-4½ x 10 Ing. X-D 283 CFM 35 P81 10-4½ x 10 Ing. X-D 283 CFM 35 P81 10-3 X 10 Ing. X-D 283 CFM 190 P81 12-10 Ing. ER 1 10 Ing. X-D 283 CFM 190 P81 12-10 Ing. ER 1 10 Ing. X-D 283 CFM 190 P81 12-10 Ing. ER 1 10 Ing. X-D 283 CFM 190 P81 12-10 Ing. X-D 283 CFM 190 I

AMERICAN AIR COMPRESSOR CORP.

Tejephone UNion 5 4848

250 KW MG Set, GE 230 VDC, 220 AC. 800 HP Motor West, CW, 870, 2200 AC. 60 HP Motor Allis C. TEFC 870, 448 AC. 10 HP GE GEARMOTOR 230 DC, 43 RPM. 7½ HP Motor West SK, 1750 RPM, 120 DC.

F H CRAWFORD & CO., INC. 30 Church St., New York 7, N. Y.

EXTRUSION PRESS

Aluminum, Direct, 600 ton, Billet heating 50' stretch press, completely furnace. piped, wired, and tested.

L. E. GANTZ, 6140 WENTWORTH ST. LONG BEACH, CALIFORNIA. PH. 390325

BENNETT MACHINERY CO.

-84" KING VERT. BOR. MILL New 1943—3 Hds.; 88" swing, 60" ram travel; 70" under rail, wt. 98000 lbs. (Send for list of 200 stock tools)

375 Allwood Rd., Clifton, New Jersey
PRinted 9 8996 K. Y. Phone 1 December 3 1227

6' arm 19" col. CARLTON RADIAL DRILL 48 Spindle Speeds 10 to 1000 RPM. 20 HP. A.C. Motor Drive. New in 1943. Inspection under power.

FALK MACHINERY COMPANY

18 Ward St. Baker 5887 Rochester S. H. Y.

Fosdick 4-spin. No. 5BMA Drill. Deckel No. SI Univ. Grinder, 1952. Cinn. 6" x 18" Model EA Grinder. No. 3 Plan-O-Mill, M.D. Late.

D. E. DONY MACHINERY CO.

4357 St. Paul Blvd. Rochester 17, N. Y.

28th St. & A.V.R.R.

MUST BE SOLI

FOR A SMALL FRACTION OF



ONE SHEPARD NILES OVERHEAD CRANE 66½; span, 15 tons capacity, 10 ton trolley with 5 ton auxiliary; electrical for 220 volt 3 phase 60 cycle; completely rebuilt in 1954, with purchase of new trolley for over \$7,000.00; complete with 350' of electrical runways; cab operated. Can be inspected under power and must be sold in next 30 days, F.O.B. St. Louis, Mo.

ONE WHITING 5 TON OVERHEAD CRANE
50' span, cab operated, AC 220/440 voit 3 phase 60 cycle, complete with 160' runway, including all necessary "A" framing; can be inspected in operation and must be sold in next 30 days, F.O.B. St. Louis, Mo.



ONE LOFTUS ANNEALING FURNACE ONE LOFTUS ANNEALING FURNACE Walking beam, gas fired, recirculating, complete with all necessary controls, motors and blowers; 1600°, equipped to handle 17 baskets 2' wide x 2' deep x 4' long; overall dimensions 46' long x 10' wide x 12' high. Electronically controlled. NEW 1951. Can be seen under

CALL or WIRE COLLECT TODAY LI-1-6545

Write for our complete foundry equipment listing—America's Largest

AAA MACHINERY & EQUIPMENT CO. CLEVELAND 10, OHIO 15539 SARANAC PD.

2—#55 Buffalo Mill Type Open Throat Bar Shears, 6" Stroke, Capacity 275 Ton. Kling No. 6 Bar & Billet Shear 6" round.

Hilles and Jones and Buffale Bar Shears 1½", 2", 2½", 3", 3½", 4" and 4½".

Plate Shear, "C", Long and Alistatter 10"x½".
Plate Shear Leag and Alistatter capacity 6' x 1"

2-A Williams White hydraulic tube bender, capacity 2".

capacity 2

700 and 1000-ton Ajax High Speed Forging Presses air clutch.

4000 Lb. Niles Bernent Double Frame Steam Forging Hammer.

Forging Hammer.
1500 Lb., 3300 Lb. Chambersburg Single Leg
Steam Forging Hammers.
Chambersburg Model J, motor drive, board
drop hammer, 1000 lb.
Nazel Air Forging Hammers, #4-8, #5-N.
Williams White Bulldozers, #22, #3, #4, #25,
#6, #29 U type.

Ajax Forging Rolls, from #1 to #4. 11/2" Ajax Upsetting and Forging Machine, air clutch.

clutch.
Alax & Notional Upsetters, Suspended Slides,
1", 11/2", 2", 3", 4".

Upsetting and Forging Machine. Net Suspended Slides, 4", 1", 11/2", 2", 21/2", 3".

300-Ton Oligeor High Speed Hydraulic Press,
2-Column, ram 27" x 23".

400-Ton Verson Knuckle Joint Colning Press.

Londis Landmaco Threading machines with lead screws four spindle 1½", two spindle ½", two spindle 1½", two spindle 1½". Multiple Punch, Size G, L & A, 140 Ton. Single and Double End Punches, various ca-pacifies and throat depths.

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIM-MERS, SLOTTERS, HOT HEADERS AND TRIM-MERS, COLD AND HOT PUNCH NUT MACHINES

DONAHUE STEEL PRODUCTS CO. 1913 W. 74th Street, Chicago 36, III.

REBUILT-GUARANTEED ELECTRICAL EQUIPMENT

SLIP RING MOTORS

	Constan	t Duty.	3-phase.	40 evels	
Qu.	H.P. 3500 2000 1250 750 000 500 500 400 400 400 350 250 250	Make G.E. G.E. Whee. G.E. G.E. G.E. G.E. G.E. G.E. Al. Ch. G.E. Al. Ch. G.E. Al. Ch. G.E.	Type	Velta	R.P.M.
1	3500	G.B.	MT-	2300	940
1	2000	G.E.	MT	6600	600
1	1250	Whee.	CW	6600	698
1	1250	G.H.	MT	2300	857
1	750	G.B.	I-M	2200	400
1	660	Whee.	CW MT ANY I-M I-M ANY	6600 2300 2300 2300 2300 2200 2300 2300	600 EBB B57 400 444
1	500	G.E.	MT	6600	600 314 450 900
1	500	Al. Ch.	ANT	2200	314
1	500	G.E.	I-M	2800	450
1	400	G.E.	I-M	2200	900
1	400	Al. Ch.	ANY	2200	514
1	400	G.E.	MT	2300	860
1	350	Al. Ch.	ANY	2200	440
1	258	Al. Ch.	ABT	440	720
1	250	G.E.	MT ANY ART MT	2800	300

SOUIRREL CAGE MOTORS

3 Phase, 60 cycle

Qu.	H.P.	Make	Type		R.P.M.			
1	400	G.B.	TR	2300	514			
1	200	Whas.	C8-878	2300	1160			
1	200	Al. Ch.	AR	440/220	600			
1	150	Whee.	C8	649/229	600			
3	126	Al. Ch.	AB	2800	495			
1	100	Al. Ch.	AB	2800	695			
1	100	Al. Ch.	AR	2304	495			
SYNCHRONOUS MOTORS								

3.Phase 40.Cycle									
	3-Phose, 60-Cycle								
Qu.	H.P.	Wake	P.F.	Volts	R.P.M.				
2	3100	G.B.	unity	2300	360				
3	2000	G.E.	80%	2200	720				
1	750	G.R.	80 %	2300	450				
î	710	G.E.	80 %	2200	720				
2	700	G.H.	88%	2300	1200				
3	000	G.E.	unity	2300	827				
1	250	G.E.	80%	2300	514				
i	250	G.E.	80.46	640	450				
9	200	Whee.	86.46	440	1200				
ī	200	G.B.	80.95	440	450				
î	150	G.E.	00.96	2300	900				
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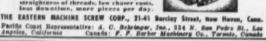
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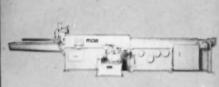
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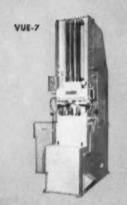
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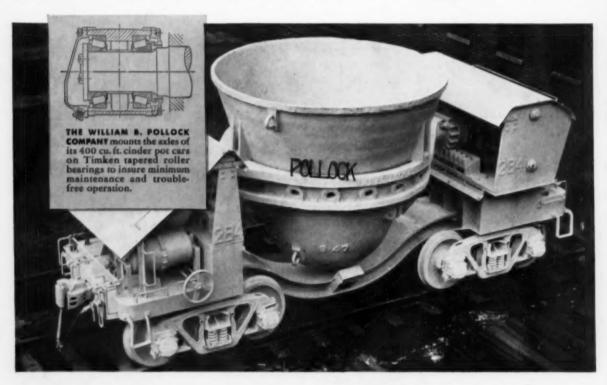
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